REPORT RESUMES

ED 003 132 64
A GUIDE FOR THE DESIGN PROFESSIONS. REPORT B--EDUCATIONAL
FACILITIES WITH NEW MEDIA.
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RENSSELAER POLYTECHNIC INST., TROY, N.Y.
REPORT NUMBER NDEA-VIIB-351 VOL. 2 PUB DATE DEC 65
CONTRACT OEC-316-031
EDRS PRICE MF-$0.18 HC-$4.36 109P.

DESCRIPTORS- *EDUCATIONAL FACILITIES, *MEDIA SPECIALISTS, *SCHOOL ARCHITECTURE, *BUILDING DESIGN, EDUCATIONAL PLANNING, ADMINISTRATOR GUIDES, SCHOOL PLANNING, SCHOOL CONSTRUCTION, *RESOURCE GUIDES, TROY, NEW YORK

THE CONTENTS OF THIS GUIDE PRESENTED A BODY OF MATERIAL TO AID THE DESIGN PROFESSIONS IN EDUCATIONAL AND ARCHITECTURAL DECISIONS. IT IS DIRECTED TO ARCHITECTS, PLANNERS, DESIGN SPECIALISTS, AND PLANNING COMMITTEES. DATA HAVE BEEN COLLECTED AND ORGANIZED FOR THE PROGRAMING AND PLANNING OF EDUCATIONAL FACILITIES. IT PROVIDES INFORMATION ON--(1) THE IMPACT OF LEARNING MEDIA ON FACILITIES, (2) PLANNING INFORMATION AND CASE STUDIES, AND (3) A SUMMARY OF DESIGN CRITERIA. THIS IS THE SECOND REPORT IN A SERIES OF THREE. ED 003 131 AND ED 003 133. (RS)

ED003132

Title VII-B-351

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EDUCATIONAL FACILITIES WITH NEW MEDIA

REPORT B

A GUIDE FOR THE DESIGN PROFESSIONS

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EDUCATIONAL FACILITIES WITH NEW MEDIA
REPORT B: A Guide for the Design Professions

The final report of an architectural research study conducted by the staff of the Center for Architectural Research, School of Architecture, Rensselaer Polytechnic Institute, Troy, New York, under the terms of contract number OE-316-031 between Rensselaer and the United States Office of Education.

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December 1965

INTRODUCTION

A report of architectural research

This report is one of a series of three resulting from a two year architectural research study funded by Title VII–Part B (Dissemination) of the National Defense Education Act administered by the U. S. Office of Education.

Three reports

This series of reports is directed at one objective–optimizing the conditions for learning by providing the environments most conducive to learning when learning media are employed in the educational process. Toward meeting this objective, a body of material–data, *design studies, premises, reactions,* and conclusions–has been collected and organized to offer guidance in the programming and planning of the appropriate educational facilities. Since a number of different types of persons are involved in providing the educational environment, this guidance is offered in the three reports, each directed to somewhat different, but overlapping, audiences.

Three different audiences

The series has been given the overall title Educational Facilities with New Media. Within this series, Report A–"A Guide for Policy Makers" is directed primarily to boards, administrators, planning committees, and institutional planners; Report B–"A Guide for the Design Professions" is directed to architects, planners and design specialists, as well as planning committees; and Report C–"A Technical Guide" is intended for those concerned with details of design–architects, engineers, equipment and furniture suppliers, and media specialists.

In preparing three reports instead of one, some duplication and overlap among them is unavoidable. However, the content and the manner of presentation of each report have been chosen with these three audiences in mind.

Points of explanation

To introduce these reports, several points of explanation should prevent the reader from moving into the reports with false notions as to content and purpose:

Provide proper environments for learning

1. The primary concern is with creating the environments for learning—with planning space and designing educational facilities. More might be said about staff organization, curriculum, teachers, resources, and finances, but this is essentially an architectural research report, and these areas are considered only as they affect school planning.

Not evaluating educational philosophies

2. In dealing with school planning, educational philosophies which serve as the basis for planning cannot be avoided. However, evaluations and judgments as to the relative merits of such philosophies have been avoided as being outside the province of the study. Rather than "here is the way to educate and therefore provide these facilities", the approach has been "if you adopt this philosophy, these are the implications for facilities".

Specifically examing media and facilities

3. Learning media are only part of the current educational scene, and a look at facilities with learning media is not a comprehensive look at all educational facilities. However, there are occassions when examining one aspect of the total system in depth is valid. Emphasis is intentionally on learning media, and their implications for facilities.

Within this framework, it is hoped that the contents of these reports will help guide those persons responsible for providing todays school buildings toward sound educational and architectural decisions.

Contents of Report A

Report A of the series took a broad look at learning media, the concerns behind their adoption, their role in innovations, and their implications for staff, budget and, particularly, facilities.

Contents of this Report B

This Report B points up the impact of learning media on facilities and presents planning information, case studies of specific facility types, and a summary of design criteria for use by those involved in the planning and design processes. Part 1 is an overview of media in education and Part 2 discusses the planning of educational facilities on a broad scale. Using these chapters as a basis, Part 3 moves into a detailed look at different kinds of facilities and facility arrangements for effective uses of learning media. Part 4, an overview of design criteria, summarizes information presented in Report C—"A Technical Report."

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1 LEARNING MEDIA AND FACILITIES: A REVIEW

Innovations indicate impact of media

That learning media are part of the fabric of American education is no longer in doubt. Naturally, not every educator regards media with equal degree of admiration or esteem for what they can do, but none can afford to ignore them. The simple enumeration of innovations in education and the impact of media in each, as presented in Report A of this series, attests to this fact

Media redefined

Learning media were defined in Report A as techniques of varying sophistication utilized for orderly organizing, presenting and storing information and for encouraging appropriate learning responses. Media may be total systems of communication in themselves, or they may serve to aid the communicative process. The printed book is a medium, and so is the chalkboard and the teaching machine.

More media than before

Obviously learning media are nothing new, but the number and variety of media available have increased tremendously over the past decade. It is particularly the newer media—those which have grown out of technological and electronic advances—that most affect the total scope of education and the design of educational facilities.

Uses of media reflect educational concerns...

In review, the development and application of new media has been brought on by a number of concerns responsible for most of the new thinking in education today:

- NUMBERS: our population is growing and a greater percentage of it is going to school; the number of well-qualified teachers and adequate classrooms is not keeping up.
- KNOWLEDGE: our rate of acculumulating knowledge is increasing every day; education must become more generalized and more specialized at the same time.

- SOCIETY: our society is placing greater value on education; not only are better opportunities demanded, but there is national concern for doing so.
- MONEY: our educational machinery keeps growing larger and more complex; to finance this, schools are finding themselves more and more in competition for funds.

...and an explosion of innovations

The result of these concerns has been an explosion of innovations in education; innovations that reflect the directions in quality, efficiency and individualization so prominent in educational thinking today.

visual display

projected------8, 16, 35mm motion pictures
slides, 2"x2" to 3 1/4" x 4"
film strips
overhead transparencies
opaque materials
shadows of 3-D objects

non-projected--chalkboard surfaces
charts, illustrations, graphics
printed materials

audio presentation

recorded--records and tapes
telephone
broadcast radio
systems for sound distribution

three dimensional

models, demonstrations, miniaturized materials

combined audio-video

sound motion pictures
sound slides
printed materials with recorded sound
kits of audio-video materials

television

broadcast and closed-circuit
live and recorded
reception by monitors, receivers, or projector

programmed instruction

visual display and texts
audio presentation
combined audio-video presentation

information systems

film-recorded
computer-based

What learning media can do

The role of learning media in these innovations is a large one. Reasons for this are not hard to uncover,

- Media can make more information available in a variety of forms, and in forms most appropriate to the desired learning situation.
- Media can be used to extend the teacher and the learning situation into areas before untouched.
- Media can make learning more effective by presenting information which is dynamic, emotional, realistic and stimulating and which extends the bounds of traditional methods of instruction.
- Media can make learning more efficient by making more information available to students in shorter times at less expense, using less (but the best) teacher time.

Media are not "taking over"

Learning media are not "taking over" education; teachers will not be replaced by technology. Media can broaden the spectrum of education; they are not total education. They can be used at times, as a substitute for conventional teaching, but are more often used to accomplish learning goals never before possible.

The future of hardware

The future indicates an expanded role for media. There will be more equipment doing more things, and more economically than in the past; specialists in the use of media will be part of the educational team. A goal in hardware development will be compatible, interchangeable components forming systems of equipment for a variety of tasks.

Implications of media for...

However, there are reservations that must be met when using media. During the innovative stages of any new educational process there are pitfalls, misapplications and undesirable results which may obscure the primary objectives behind the innovation. In this light, media makes certain demands on education,

...staff...

- Staff must learn to work and plan together; to be able to define learning objectives, devise systems for teaching, and plan the use of media well in advance of actual needs.

...administration...

- Administrators must provide the educational leadership and climate necessary to carry through innovations.

...planning

- Planners must recognize the impact of media on education and develop facility types that will support and extend their contribution to effective learning.

Media requires new concepts of facilities and design

The key word is "planning." Educators must plan for the uses of media in the classroom, and educators and architects together—through the programming process—must specify appropriate facilities for effective use of media. It is this concern with planning and design of facilities to which the remainder of this report is addressed. In fact, the basic premise of this report is that effective utilization of new media requires new concepts in facility types and their design.

2

PLANNING SCHOOLS FOR MEDIA: GENERAL PRINCIPLES

Planning principles reviewed periodically

For the educator-administrator defining building needs and the architect-planner designing schools, the utilization of media implies a number of basic principles for planning that must be considered to assure the creation of an appropriate learning environment. These principles are significant at all stages of the building project; they should first be reviewed when the building is being initially considered, again during detailed programming, and at many points in the actual design and construction. In many cases, the implementation of these principles will not only affect the design and construction of the building itself, but will often require the development of appropriate policy by administrators and boards to insure the successful use of media.

> *I don't think there is anything happening today that is more important for us to do than to implement the use of instructional media and aids. It's through these aids and media that we can achieve a higher quality of educational programs. It means new and better instructional materials, better supplies, and more and better equipment.*
>
> *It means above all, I think, that we are working toward a more precisely controlled environment for learning. And this comes through building design.**
>
> *...Dr. John Gilliland*

Principles used by architects, administrators, policy makers

These planning principles are of primary concern to the architect-planner and all others directly involved in design and equipping; they must also be a part of the planning tools of the administrator, and the working vocabulary of the policy maker.

---

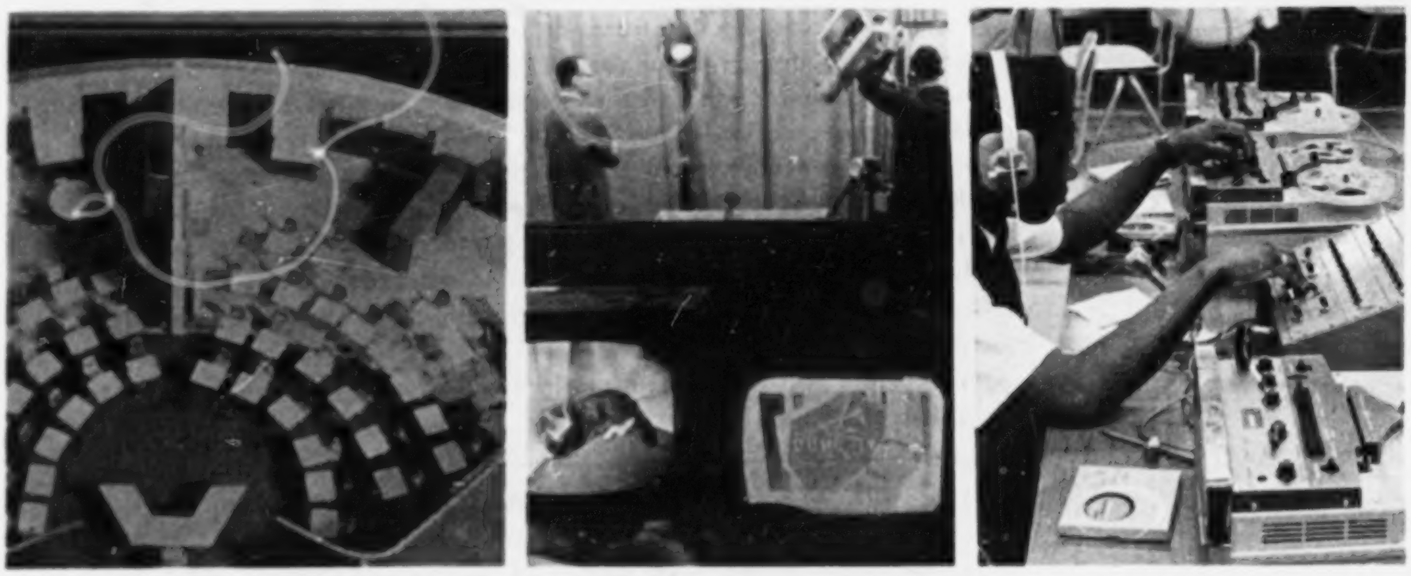
*These quotations are taken from the report of "Three Meetings in May", a series of seminars conducted as part of this project.

2 / PRINCIPLES

Three categories of facilities required

1. Three general categories of facilities are involved when media are to be properly utilized:

- learning facilities—in which the student or groups of students come together with media for the purpose of learning.
- facilities for storage and access—in which media in various forms are catalogued, stored, and made readily accessible for learning situations.
- production and support facilities—in which media in a variety of forms are produced or originate to meet the needs of particular learning requirements and where the teaching staff receives assistance and support in the effective and efficient use of media.



All types represented

For significant uses of new media, all three facility types will be represented; their coordinated planning is an obvious necessity. It is particularly important that these three categories of facilities be first recognized and provided during the programming phase of a school building project.

Part 3 contains information on learning facilities...

For this report, learning facilities have been divided into six types—independent study; small, medium, large, and flexible groupings; and renovated classrooms. Design studies and information for each type are presented in Part 3.

...storage and access facilities...

Design studies for storage and access, or resource facilities are also presented in Part 3. These spaces may be small and an integral part of the learning spaces, or, with the advent of sophisticated information storage and retrieval systems may include large, centralized electronic storehouses.

...production and support facilities

The production and support facilities may house a wide range of functions from teachers making overhead transparencies for classroom use, to television production on a regional basis.

Co-ordinated systems of facilities

2. The effective use of media requires the development of systems of facilities composed of elements which represent the three categories of space identified previously. A lecture hall with facilities for using media cannot be considered alone; the media must be produced somewhere and must be made accessible through other types of facilities.

The provision of all the necessary elements to make a total system, and the functional and administrative relationships among the elements must be considered initially during programming, as well as later in planning.

> Our experience has been, that rather than not using multi-purpose rooms enough, we have been trying to use them more than we should. I don't believe basketball and physical education activities and eating should be done in the same place. To borrow an old term, it becomes a "multi-useless" room.
>
> ...Dr. John Gilliland

A mix of facility types seems generally appropriate

3. For most schools, a mix of these various facility types will be necessary to meet educational objectives. The greatest distinguishing feature among schools should not be the provision of one type of facility with media to the exclusion of others, but an emphasis on one or two types of space within a mix of types. In addition to providing a more stimulating architectural and educational environment, the school with a mix of facilities provides a high degree of flexibility of use and educational approach through the scheduling and utilization of the various facilities.

> We must realize, however, that no course can meet a student's needs if it is conducted entirely in one size group or in one way, any more than any course can meet a student's total needs if it is done entirely by television.
>
> ...Dr. Winslow R. Hatch

Environment must not just house learning

4. The planning and design of the learning facilities must create an environment which not only houses, but encourages, and in no way interferes with desired learning. This premise has important implications for design features such as lighting, climate, color, seating, acoustics, equipment and controls, and the relating of spaces and circulation. It means that, for instance:

- **there should be no glare in a room to distract a viewer's attention.**
- **seating should not only be comfortable and provide correct posture, but also support other appropriate learning activities —note-taking, referencing, using individual learning materials, etc.**
- **large expanses of glass admitting natural light may be distracting and may interfere with the display of projected images.**
- **areas for individual study should not be located near areas of heavy circulation and movement with all the attendent distractions.**

It also means that learning objectives must be spelled out before architectural program and plans can be developed.

> *Every bit of "noise" you introduce into an environment decreases the ability of the people in it to produce. The more noise of all kinds, the more flickering of light, the more movement that's irrelevant to what you are doing, the more exhausted the people get. There are no exceptions.*
>
> *...Dr. Arthur W. Foshay*

Media potentially available

5. Appropriate media should potentially available in every learning situation. In some cases, this may simply mean the installation of cables and conduits for future introduction of equipment. Other times, it will necesitate providing for the later incorporation of large information display surfaces and related equipment. This will require initial provision for proper lighting, acoustics, seating and similar design features.

This also requires defining what the potential uses of media in a space may be, before designing space to anticipate its use.

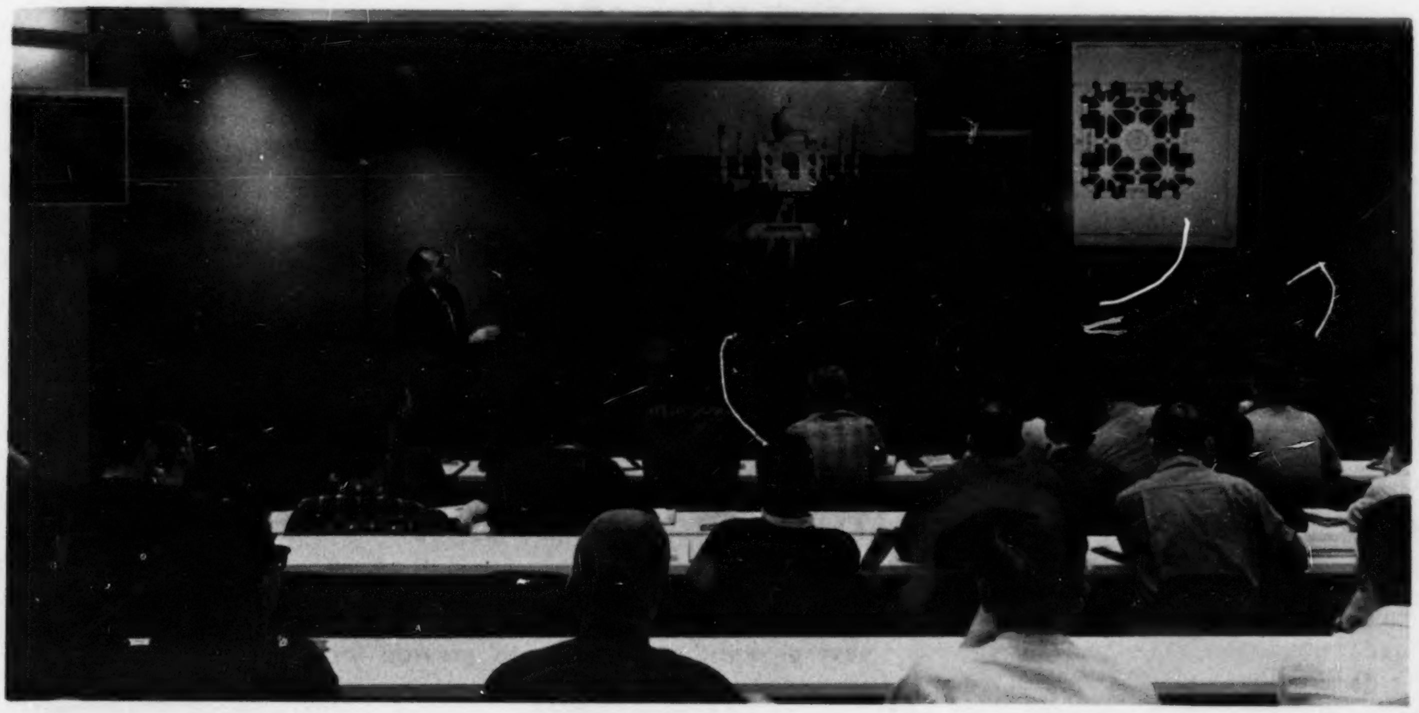
> We need the kinds of teaching and the kinds of facilities that are appropriate to the individual modes and styles of learning that students bring to class. One child can learn well from a recording, from a lecture or from reading; another child learns better from dramatic play, role-playing, or seeing a concrete model or from some other kind of illustration or effort. Each person has his own style, his own way that works best for him and it behooves the school to provide for this range of difference.
>
> ...Dr. Melvin W. Barnes

Often multi-media necessary...

6. Multiple media—media of different types—will be essential in many learning situations. The media must be organized and the facilities planned to permit whatever multiple use is required by learning objectives. For instance, television alone may not be able to carry the full communicative burden in a learning situation; it will be desirable to have films, audio tapes, and other media available for use.

...and sometimes simultaneously

Further, in some situations, two or more types of media will be used simultaneously. Although there is a great deal of research necessary to establish the validity and appropriateness of simultaneous multi-channels of communication, many learning spaces must be designed for the simultaneous display of information.



Interchangeable age levels

7. Facilities for extensive and sophisticated uses of media should be planned to accommodate a range of student maturity levels enabling their reassignment as determined by changing community needs. In view of the costs involved in building and equipping these facilities, they should not be so rigidly geared to one age level that they cannot be assigned for use by other groups as required. This interchange of age levels provides one further type of flexibility in use.

Flexibility has many connotations

8. "Flexibility"—accommodating variations in equipment, teaching methods, technology, and group sizes—is a term with broad and varied implications and with hazards of misunderstanding and misinterpretation. It includes concern for returning to the old as well as changing to accommodate the new. Part 3 devotes a section to design studies which provide flexible groupings. As noted there, flexibility of the kind which calls for demountable and folding partitions can easily place restrictions on effective uses of media through less-than-optimum viewing and hearing conditions.

Four needs in rearranging space

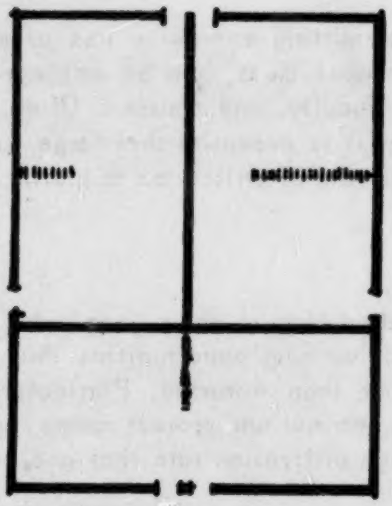
Flexibility to allow rearrangement of space can be defined in terms of four needs:

- hour-to-hour (or even minute-to-minute): the need to accommodate different group sizes, or to provide a variety of learning situations in the school day (or even in the school period). This type of flexibility is best accomplished by moveable panels, space dividers on rollers, folding and accordion partitions. The teachers (and possibly the students) should be able to easily operate whatever devices are used. The whole process of making the change should take no more than a minute or two at most.

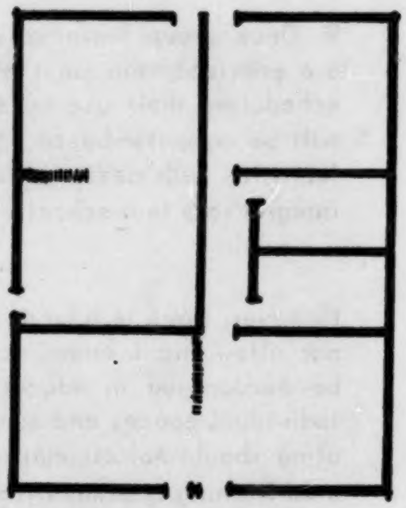
- day-to-day: the need to provide for program changes from week-to-week. The same criteria as "hour-to-hour" apply to this type of flexibility, except that there is more time to allow for relocation of heavy furniture and rearranging other contents of the spaces involved.

- term-to-term: the need to accommodate changes in the school schedule—more classes, fewer students, more seminar situations, etc. This is the kind of thing that varies from term-to-term, and there are a few days available to provide the new spaces. Here, demountable partitions are likely to be the answer.

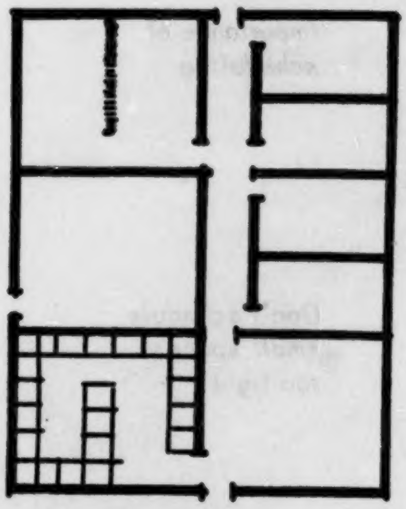
- year-to-year: this is really the same kind of flexibility mentioned in the paragraph above, except that there may be several months in which to provide for it. The traditional answer is knocking down block partitions, rewiring, etc.



hour-to-hour & day-to-day flexibility



term-to-term flexibility



year-to-year flexibility

Other types of flexibility

As previously mentioned, flexibility may be also achieved by providing a mix of facility types which are scheduled to meet varying needs and by allowing the interchanging of age levels. It may be also achieved by under-utilization of the existing facilities.

Analyze type of flexibility by analyzing functions

Analyzing learning spaces in terms of functions may help establish the appropriate type of flexibility:

- **interchangeable functions: usually small spaces which can be converted from seminar to recitation to individual study, etc. The discipline is not the design standard: the varying functions it houses is. The key is convertability.**
- **specific functions, but multi-discipline usage: a lecture hall with media supports one educational process or one function; but it can be used by many different disciplines. The scheduling of these spaces provides flexibility.**
- **specific unidiscipline usage: some learning facilities can only house one function and one discipline; multiple uses are not appropriate.**

> ***The architect is certainly faced with a real conflict between flexibility in one dimension and commitment in the other. What we're really looking for is some optimal compromise or "trade-off" between these two dimensions.***
>
> ***...Dr. John Cogswell***

Importance of scheduling

9. Once group learning spaces permitting extensive use of media are provided, the most efficient means must then be employed for scheduling their use by students, faculty, and courses. Often, this will be computer-based scheduling; it is essential that large, costly facilities with media achieve a high rate of utilization to justify their integral role in a school plant.

Don't schedule small spaces too tight

However, there is a point where scheduling which is "too tight" will not allow the informal, unplanned learning opportunities that must be encouraged in education, rather than thwarted. Particularly in individual spaces and small group seminar and project rooms, scheduling should not attempt such a high utilization rate that non-scheduled learning is eliminated.

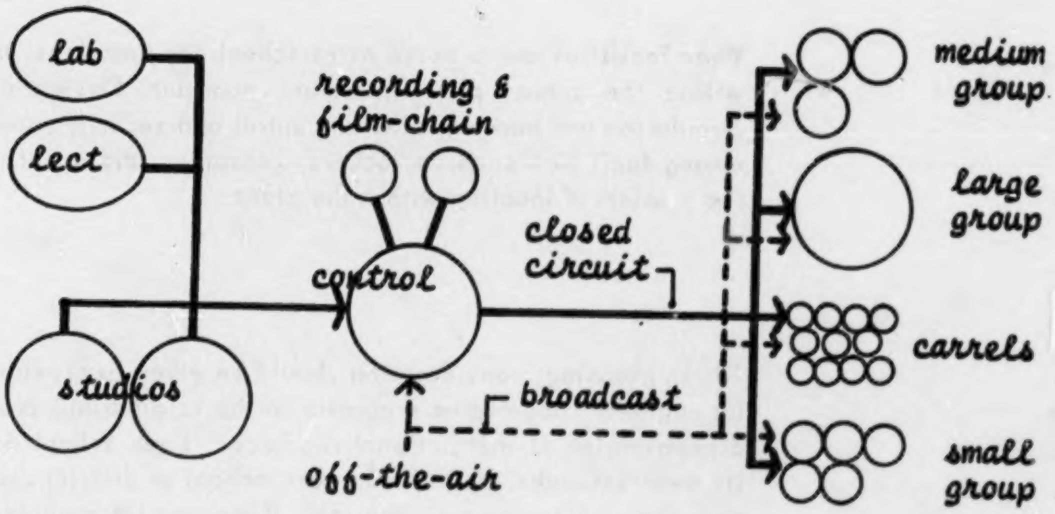
Plan for change and updating of equipment

10. All facilities which use or which support the use of media should be planned and designed to permit periodic changes of hardware and equipment, as it is impossible to prevent the obsolescence of equipment installed at the time the building is initially occupied. Provisions should be made in anticipation of such eventual changes when the building is designed, and budgeted funds should be available for a long term program of modification and up-dating. Cable-trays, open couduit, and dropped ceilings permit changes in wiring and cables without changing the building itself.

> *I think, if the architect and the educator have a joint responsibility here, it is that we can't wait for the matter of equipment to be thought of later; it has to be thought of as part of the building contract. In fact, we don't think of designing space unless we talk about the teaching aids and all the electronic equipment that's needed to do the teaching job.*
>
> ***...John Shaver,* AIA**

Hardware as systems of components

Also, hardware and equipment, the "things" of media, should be considered components of systems which must be co-ordinated to facilitate interchangeability and growth and to help further overcome the problems of obsolescence and change. The use of co-ordinated components can permit economy in initial purchasing, reduction of maintenance and replacement costs, and simplified operation by staff and faculty. Hardware should not be looked on as gimmickry, but as integral elements of the educational process. Only equipment should be included which meets basic economic standards. Often the educational goals can be easily met, by simple, dependable, easily operated, and inexpensive equipment.



A TV system requires an integrated "system" of equipment components for origination, distribution, viewing and recording.

Remodeling to accommodate media

11. Existing educational facilities should be remodeled to improve their appropriateness for uses of media. Often at a cost much less than new construction, existing facilities can be remodeled for satisfactory use of media. This up-dating process should be a natural and integral part of administrative budgetary planning.

> I think we've got to also set money aside for making anticipated changes. Are we putting money in budgets, not only to tear down old buildings or to renovate those that are obviously obsolete, but money to make the changes which we know are coming? The building as planned may be perfectly good, but we know we have to make some changes eventually.
>
> ...Marvin R.A. Johnson, AIA

Use of a "media module"

The design studies presented in Part 3—"Renovated Classrooms"—are presented specifically to illustrate the effective conversion of existing facilities. Often minimum expense is involved once a "media module" or some other form of an "equipment-cabinet unit" has been provided. (see study SG-1 in Part 3). The conversion of existing facilities calls for great ingenuity and creativeness on the part of the designer, but can easily become the most significant investment a school can make.

Use of media for other types of education

12. Educational facilities with media are capable of rendering service far beyond the normal school day and should be planned to include programs such as continuing education, job retraining, cultural enrichment, and adult education. Experimental uses of media in such programs have indicated an expanded role for media in all types of educational activities; certainly, such uses should be considered early in the programming phase.

Location becomes important

When facilities are to serve extra-school day functions, their position within the school plant becomes important. Design of entrances, circulation and parking; ease of control and security; and relationship among facilities such as lockers, resources and supplies, all guide the problem of location within the plant.

Regional cooperation in uses of media

13. In planning, consideration should be given to providing facilities for regional cooperative programs in the origination, production, and dissemination of instructional resources. Each school does not print its own textbooks; neither can each school or district produce all the necessary instructional materials. Experimental programs in several locations throughout the country today are indicating the logic, if not the necessity, of such regional production facilities.

Regionalization implies new building types

The impact of such regional approaches is indicated by the discussion of new building types in Part 3. Further, recent Federal legislation (Titles II and III of the Act of 1965) underscores the significance of regionalization by providing funds for implementing programs including production and evaluation of media.

Facilities with media important in innovations

14. The planning of educational facilities with media, particularly the conversion of existing facilities, can play a significant role in encouraging educational change towards realistic, well-defined goals. Innovations in education can be directed and encouraged by the kinds of facilities provided, and certainly, facilities which permit the use of media are among the most significant. Emphasis should be placed on the small, local, inexpensive demonstration project which brings innovations—and proper facilities—to the local teacher and professor.

Planning for visitors

There is another side to innovation and facilities. Schools designed to house particular innovations will certainly attract large numbers of visitors. Provision should be made for handling these visitors, for observing without disturbing, when the school is initially designed.

Facilities for teachers and professors

15. Planning for appropriate uses of media requires facilities for teachers and professors, facilities such as offices, planning and conference rooms, reference and resource areas, and simple teacher-oriented production. These facilities will be scattered about the educational plant with many of them oriented to the library or resource center.

Faculty trained to use facilities properly

16. Providing all the necessary facilities for utilization of media does not guarantee that the facilities will be used effectively. Administrative leadership must assure that production and resource facilities are properly staffed and that the staff is motivated to assisting teachers and professors in meeting instructional objectives. In addition, training programs, in-service education, release-time for planning and other procedures must be employed to ready and to train the faculty in the proper use of facilities with media.

> *In my opinion, before you have a good faculty, you must have a good backup staff in terms of technicians, assistants, and multi-media people. After this, you need the properly motivated faculty.*
>
> *...Herbert H. Swinburne, FAIA*

Detailed design criteria required in planning specific rooms

Finally, the planning of individual spaces and rooms for the use of media, or to support their use, requires special attention to design criteria such as the location of display surfaces, the definition of viewing areas, the planning of lighting, seating, and acoustics, the arrangement of entrances and circulation paths, and the positioning of equipment, conduit, and controls. Specific design criteria are discussed in terms of individual facility types in Part 3. Detailed design information is presented in Report C–A Technical Guide, and is summarized in Part 4 of this Report B.

3 FACILITIES WITH MEDIA: PLANNING GUIDANCE

Design guidance for facility types

The general principles for planning schools with media discussed in Part 2 will eventually be translated into physical form through the design of the various parts of schools and colleges—classrooms, lecture halls, seminar rooms, laboratories, resource centers, production-support areas, and so on. Each of these facility types, using or supporting the use of media, requires special consideration. Guidance in their design seems especially appropriate and useful at this time.

Nine categories of facilities in this part

The facility types to be presented in this Part 3 are organized into nine categories; the first six deal with learning spaces according to size, grouping and appropriateness for renovation. The seventh and eighth cover the other elements of the "media system"—resource and production-support facilities. The last category presents three new building types which have resulted from the utilization of media.

Stock solutions inappropriate

Therefore, in this Part, the text and graphics describe facility types rather than total school buildings. This is intentional. Since the way in which these facility types are chosen and put together will vary according to individual needs and philosophies, it would be presumptuous and unrealistic to offer total or stock solutions.

Graphics show principles, not "pat solutions"

It is assumed that once the programming process has established the kinds of facilities required, the designer-planer will turn to the appropriate pages in this Part for guidance in design. The graphics are not to be taken as "pat solutions" to be copied for ready use; they are presented because graphics seem the best way to communicate with designers.

IS INDEPENDENT STUDY FACILITIES

Probably no concept has sparked more attention or caused more debate than that of independent study and its role in contemporary education. As more schools and colleges provide for more individualization, as more students are encouraged to assume responsibility for their own learning, and as a wider variety of experiences are introduced into education, the need for housing independent study becomes an important planning factor.

Even the strongest proponents of independent study do not agree on how much time the student should spend working on his own. Those who have studied the situation, however, agree on some basic points:

- No student will spend all his time in independent study, and not all students can handle independence. There are wide variations.
- Independent study needs to be complemented by group activities, particularly seminar and project situations which allow a small group to share experiences.
- Programs utilizing a high degree of independent study place special demands on the teacher, support staff, administration, resources and facilities. Certainly independent study programs are not undertaken to reduce the need for these things.

Implications for facilities to accommodate independent work remain somewhat indefinite; they will vary widely, according to particular philosophy and way in which it is implemented. To complicate this, educators and architects are continually impressed with how little they really know about the learning environment and how it can add to or detract from effective learning. Questions such as, "How isolated should the student be?", "Should he stay put or be allowed to move around constantly?", "Does he need a visual contact with the out-of-doors?", "How much control should he have over his environment?" are being asked for all levels of education. So far there are not many definitive answers.

Despite these obstacles, there are certain points that can be made about independent study facilities:

Spaces for Independent Study

- No single room in the school building should be set aside as an independent study room; these areas are best scattered throughout the building to be where the students are.
- Areas for independent study can be set aside in many places of school buildings—both new and existing. Diagram A illustrates this point.
- Independent study units probably function best if grouped in small clusters. In this way they can share common services and other elements of environment such as lighting, acoustics and climate control.

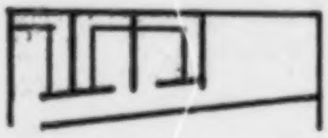
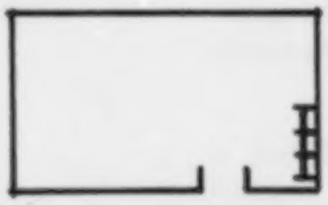
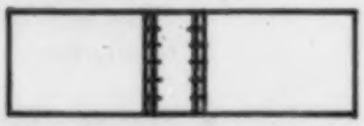
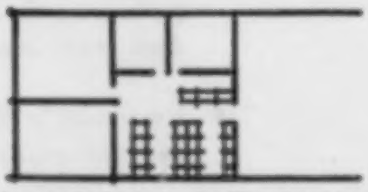
	existing buildings	*new buildings*
project areas	 - *as project rooms or areas within remodeled facilities* - EXAMPLE: RC-7	- *as project rooms or areas associated with a variety of different spaces and groups of spaces* - EXAMPLES: SG-6, MG-2, MG-4, LG-4, LG-5
classrooms	 - *within existing classrooms* - *in former cloakrooms and other spaces between existing classrooms* - EXAMPLES: RC-2, RC-3	- *within new classrooms* - *between new classrooms*  - *as part of a suite of facilities including classrooms* - *should be in view of teacher in elementary schools; some isolation is permissible in secondary schools* - EXAMPLES: MG-1, MG-3, MG-4, LG-5, FG-1, FG-2, FG-3
resources centers	- *limitations due to lack of conduit for electronic carrels and insufficient electrical outlets for projection devices, recorders, etc.* - *general lack of room for carrels* - *inadequate lighting a problem*	- *relate to media storage* - *avoid regimented appearance* - *may be scatted throughout stack and reference areas*  - *may be related to both classrooms and resources center* - EXAMPLES: RF-1, RF-2, RF-3
cafeteria, gymnasiums, etc.	- *simple carrels can be created by portable dividers used with dining tables* - *difficult to introduce electronic devices* - *problems of light, ventilation, circulation and regimentation*	- *can use furniture with built-in outlets & plug-in electrical and TV conduits* - *portable equipment with built-in or portable dividers on dining tables* - *problems of light, circulation, and sound*
circulation areas	- *probably prohibited by codes, lack of adequate space, and insufficient lighting*	- *may work if circulation is not distracting and if light and acoustical control is possible* - *may work as "cul-de-sac" spaces just off circulation areas*

DIAGRAM A

There may be larger groupings in and around the resources or instructional materials center. Particularly in the lower grades, independent study areas will be related directly to the group learning spaces.

- If many study units (such as carrels) are brought together, it is important to visually and functionally "break-up" the space in which they are situated. Students have always shown a marked dislike for studying in large barn-like spaces filled with other students and regimented furniture.
- Placing study units in or adjacent to corridors or circulation spaces may add noise problems and the distraction of moving people.

Relating Independent Study to other Facilities

- Project and seminar areas where students can get together and share learning experiences should be adjacent to independent study areas.
- Particularly in the lower grades, independent study areas should be directly related to group rooms. In upper levels, the independent areas will be related to discipline-oriented facilities, as well.
- In schools relying heavily on an independent study concept, spaces for teachers should be close to the independent study areas in order to allow for consultation, conference sessions, and other close student-teacher contact.
- If students are to remain in individual learning experiences for long periods of time, nearby "social" or "commons" areas for interaction and relaxing may be desirable.
- Evaluation and testing spaces will be needed if continuous progress or nongrading is part of the school's program.
- Some (maybe many) independent study units should have access to the resource center; this may be done by locating them in or near the center, or by using remote "call-up" devices to bring the resources to the student. As the technology moves ahead, the latter will become an increasingly desirable way to solve the problem.
- Many of these relationships among facilities are illustrated by Diagram B.

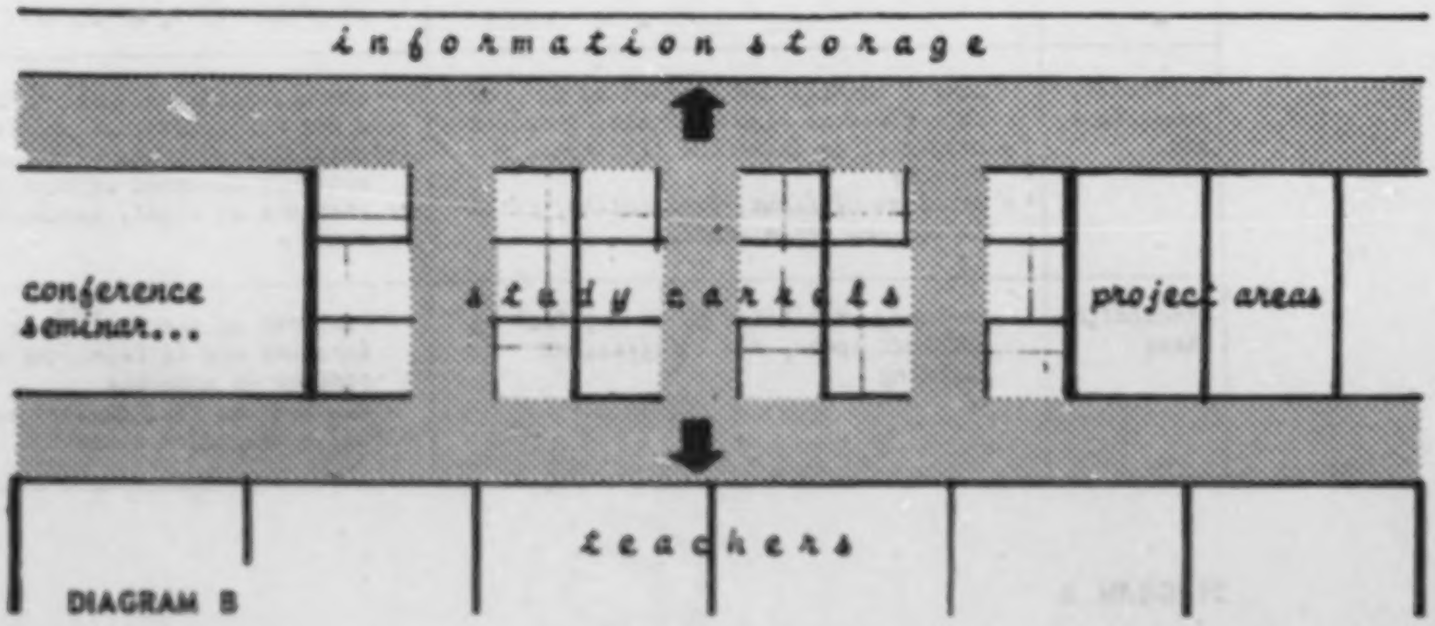
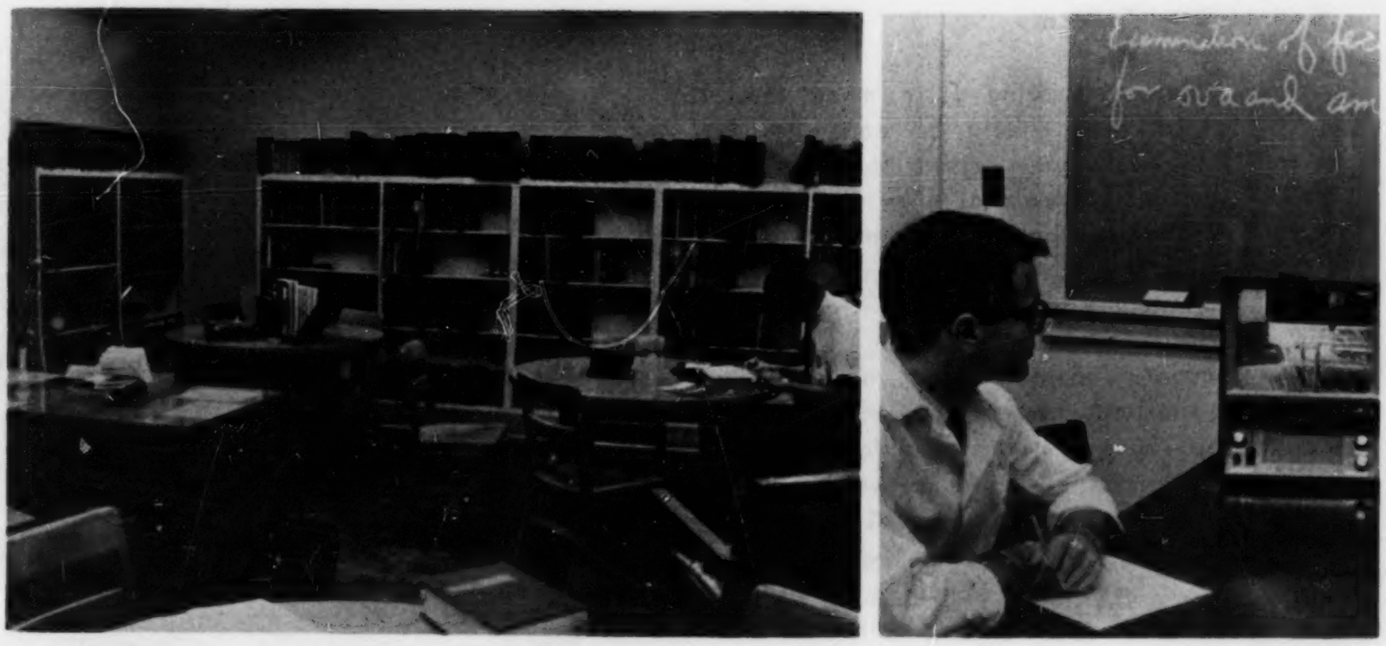


DIAGRAM B



Independent Study Units

- The actual study unit may be an enclosed or semi-enclosed carrel, with or without electronic devices which can be commercially bought or "home-built" and sometimes it can accommodate more than one student. Study units may also include cubicles, enclosed rooms, special equipment and seat units, tables and chairs, lounge chairs, built-in seating, or any other unit which provides the particular functions a student needs to work, study, and learn by himself.

- Carrel units may either be assigned to students as a "home-base", or be available on a "first come—first served" basis. The former approach is appropriate in schools which abandon homerooms in favor of the "home-base" concept.

- Some carrels may accommodate special functions such as typing, teaching machines, audio-visual call-up, audio recording, and computer-based learning. It might be wise to group units according to special types to minimize interference between them.

- Special-purpose carrels may require wiring, gas, water, or air service. Most study carrels will not need these services, except for power outlets.

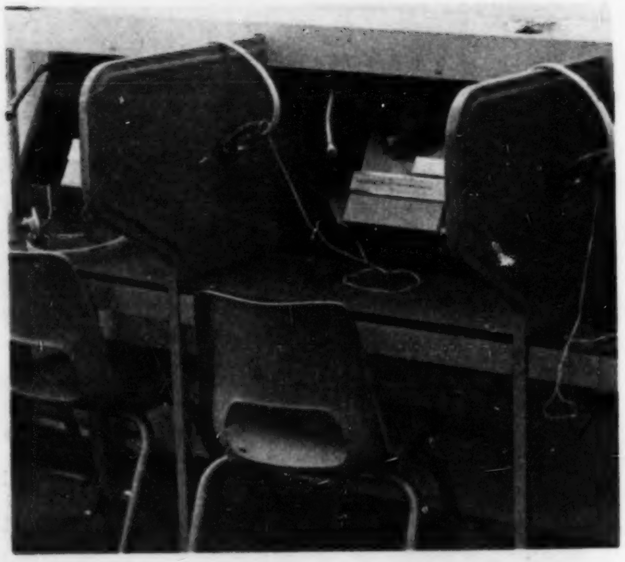
- With individual carrel units, storage space for books and materials (possibly coats, hats) is necessary. Even if carrels are not assigned to specific students, thought should be given to providing spaces for keeping books and materials in the unit on a "reserve" basis.

- Carrels will vary in design; some should give students a sense of privacy and "identity" but not complete isolation, while others will provide total acoustic and visual privacy. Individual units, particularly carrels, will vary in design and function depending on the age level, the duration of occupancy, and the learning functions to be housed.

- As a general rule, no one type of study unit should be provided exclusively. A mix of many different types, functions, and groupings will usually best meet a school or college's programs. In any case, row upon row of carrels, all exactly the same, should be avoided.

Environmental Concerns

- Adequate lighting is a must. Overall illumination should be soft with particular emphasis given to the working surfaces. Glare should be avoided. The details of lighting in terms of quality and quantity will vary according to the individual's task.
- Acoustic considerations vary according to the functions and type of independent unit. A wide range of allowable noise levels can be found between different independent study areas. Typing, audio recording, and uses of recorded sound should be isolated from other independent functions, although head-phone sets are alleviating the latter problem.
- Students in independent study should be free from distractions of sound, movement, light and climatic changes. In other words, design out ringing telephones, glare, drafts, unrelated circulation, and such.
- Ventilation must be carefully designed; air change should be frequent and some thought might be given to some variations in temperatures to allow for some individual preferences.
- In colleges, if smoking is permitted in the school building, some independent study units should be in restricted areas.



The applications of some of these principles are included in the material on "Resource Facilities". Whenever the independent study units are provided—in classroom, resources center, study area, laboratory, or wherever—they should be designed and arranged to accommodate a variety of functions. This will usually be accomplished by a mix of types of units. Educators have decried the use of "self-contained classrooms" to solve educational needs; careful planning and design will be necessary to prevent the "self-contained classroom" from being replaced by the "self-contained carrel".

SG SMALL-GROUP FACILITIES

Small-group instruction is no longer the prerogative of higher education. Many innovations in elementary and secondary education, particularly nongradedness, tracking and various forms of team teaching and planning, have rendered seminar rooms, project rooms, and student conference facilities not only desirable, but often necessary as part of the system to carry out educational objectives. The provision of media in these rooms, both as part of a larger communication system and for self-contained uses, is a significant refinement that is finding more and more educational acceptance.

In general, small group spaces provided with media may be:

- Part of a resource center to be used by groups of students with and without teachers to review and to learn from resource materials such as films, slides, and transparencies. Such small group spaces may be nonscheduled and used informally and on demand, or they may be a scheduled part of a course or curriculum.
- Part of a teachers' area when informal and nonscheduled conferences and seminars are encouraged, particularly in nongraded and individualized programs. Such a teachers' area may contain a number of teachers' offices plus the small-group spaces, or the small-group spaces may double as teachers' offices.
- Scattered about higher, secondary, or middle school buildings, both as scheduled and informal use spaces. These will often occur in conjunction with laboratories, large group classrooms, and specialized instructional rooms where it is desirable to take a part of a group aside for special small group activities, or where a large group is quickly divided into several smaller groups for interactive and more personal learning.
- Grouped together and scheduled as multidiscipline spaces, particularly in higher and secondary education. Here the seminar or conference is as much a part of the instructional techniques as recitation, laboratory, and lecture. Groups of seminar rooms must be provided as are classrooms, laboratories, and lecture halls.

The provision of media creates no great design problems when planning new schools or remodeling existing ones, once the uses of media with small groups have been determined. There are some planning considerations which should be kept in mind as programming and design proceed:

- A variety of seating arrangements–tables, loose chairs, and table–chair units–are possible as long as all seats fall within the viewing area or any significant display surface or combination of display surfaces.
- There is a variety of small, lightweight, and relatively inexpensive projectors–slide, film, and overhead–that work well in small rooms since high lumen output and elaborate remote control features are not important. Particularly significant is

the development of 8mm film projectors, including the cartridge–loaded type, for use in rooms of this type.

- With small images of relative brightness and often with little or no outside natural light to control, either front or rear projection may be used. In this type of room, white plaster walls can be used for front projection, or self-contained cabinets–"media modules"–can be built in (or used as moveable elements) within the room.
- For most rooms of this size, a single 23" or 24" TV receiver or monitor will provide good viewing for all occupants.
- Lighting is generally easily handled; either incadescent or fluorescent systems will work satisfactorily. Two levels of illumination would be highly desirable; the lower level would be used during projection.
- A character conducive to informality and interchange can easily be introduced in this type of room through the use of carpeting; the careful selection of furniture textures and colors; the design and detailing of the room, and the room's own inherently small scale.

In view of the current concern for achieving high utilization rates for educational facilities, it should be cautioned that much of the benefit of the conference and seminar can be lost if the spaces are scheduled too tightly. Slack in the scheduling of this kind of space is important to encourage informal and student-initiated learning experiences by class changes and prescheduled uses.

SMALL-GROUP STUDY SG-1

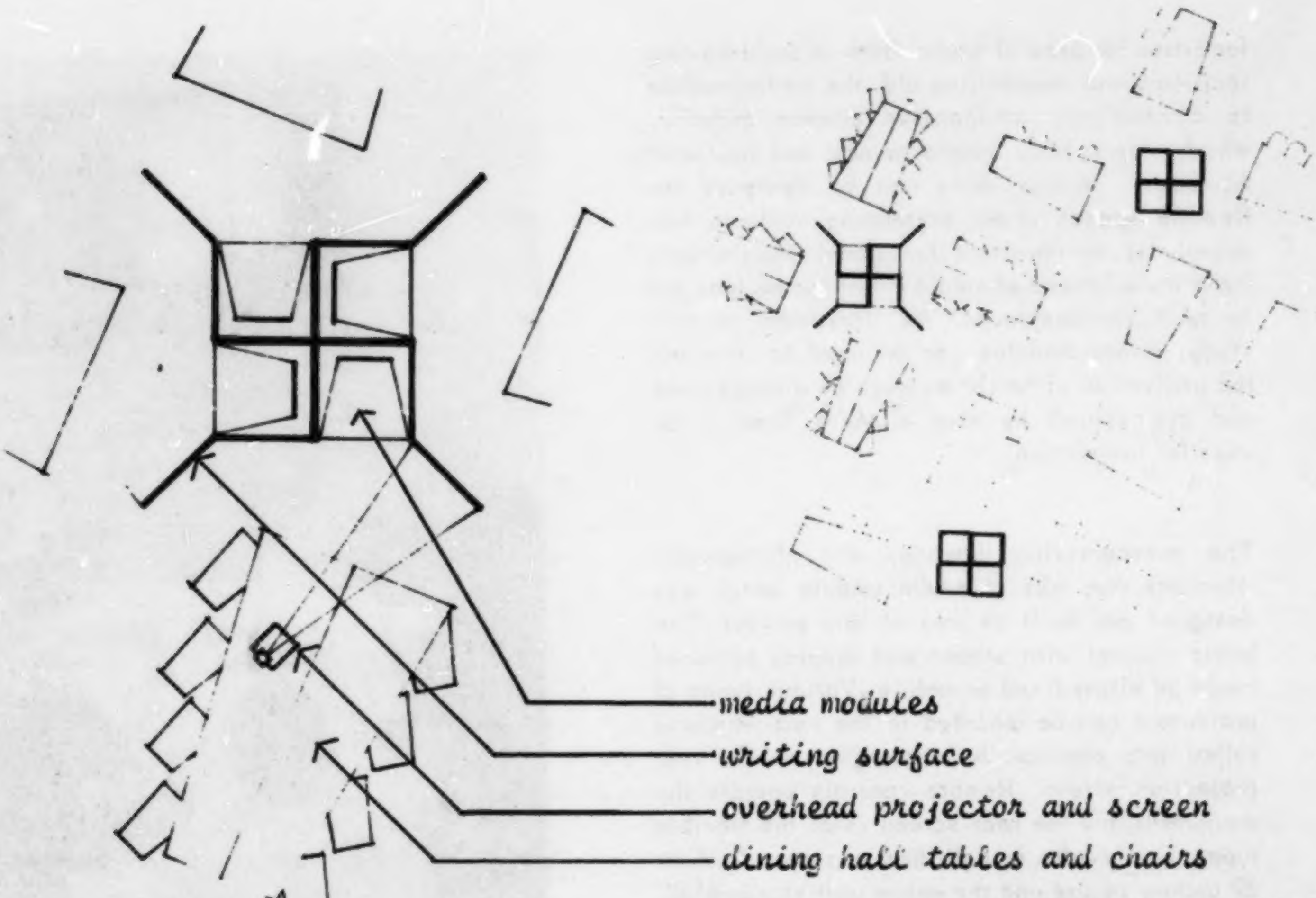
Planners of educational facilities are often struck by the similarity between small group learning activities and the kinds of discussion and interaction that take place around the table in a dining room or restaurant. The concentration and focus of the individuals around the table, whether eating or learning, seem to exclude the noise and distraction caused by others in the room similarily engaged.

This study explores the possibility of utilizing dining facilities for seminar and conference activities. Here the utilization of media is handled by cabinets containing equipment which are opened up and around which the group focuses its attention. The cabinet provides a projection screen for a small overhead projector located on the table, a rear projection screen for films and slides, and chalkboard and tackboard surfaces. Four groupings could be located around a core of four such cabinets.

These cabinets could be permanently located in the dining room and opened up during the normal academic day for discussions, seminars, and conferences. The plan indicates the location of several such media centers and the groups that they would serve. As an alternate approach, the cabinets could be mobile and brought into the dining area and positioned as needed for instruction. A further refinement would be fixed cabinets with mobile equipment carts which would permit the interchanging of various types of equipment.

Recorded sound accompanying any of the projected media would be handled by individual head sets or low volume speakers mounted on the folding wings and directed to serve only the small group gathered near the cabinet.

It has often been assumed that cafeterias and dining halls should be used for large group instruction in order to increase the utilization of such facilities. It may well be that a better answer is to use such space for small group activities which can also utilize learning media.



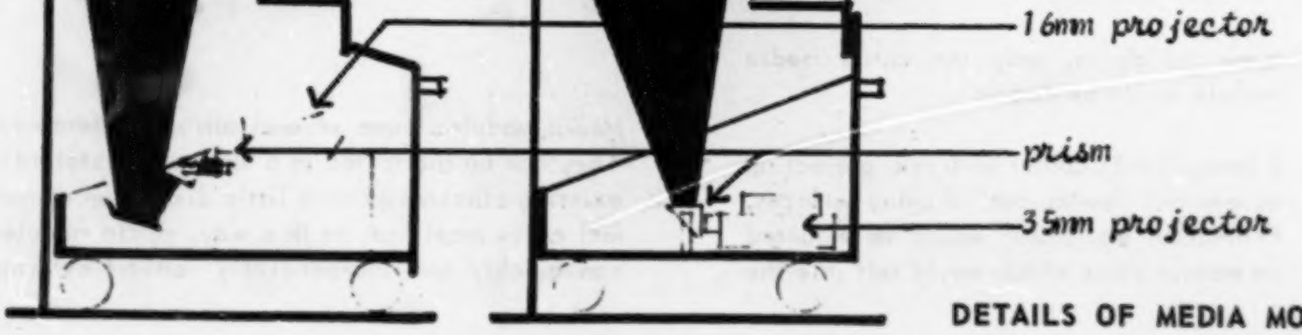
DINING HALL LAYOUT

This study led to the design and development of a self-contained media cabinet which might be used in many types of small and medium group situations. These "media modules" can be of several types:

- a fixed cabinet with self-contained equipment, rear projection screen and several additional "swing-out" display surfaces.
- same as above, only the entire media module would be mobile.
- a basic fixed cabinet with rear projection screen and "swing-out" display surfaces. Projection equipment would be mounted on mobile carts which would roll into the cabinet and which would permit the interchanging of projectors.
- same as above with both the basic cabinet and the equipment carts mobile.
- any of the above, but with a cabinet and rear projection screen sized to accommodate two rear projected images side-by-side.

Media modules have several attractive features. They can be fabricated in a shop and installed in existing classrooms with little disruption of normal class meetings; in this way, media modules can quickly and inexpensively convert existing facilities for uses of media. Both in building new facilities and remodelling old, the media module is a relatively inexpensive answer initially, which also readily adapts to new and improved equipment. Mobile units can be designed for flexible spaces where regrouping students frequently is an important functional requirement; fixed installations of media might not be feasible in such circumstances. As illustrated in this study, media modules can be used to increase the utilization of facilities such as dining rooms and gymnasiums by also allowing them to be used for instruction.

The accompanying drawings and photographs illustrate one type of media module which was designed and built as part of this project. The basic cabinet with screen and display surfaces could be either fixed or mobile. Various types of projectors can be mounted in the cart which is rolled into position for projection on the rear projection screen. Remote controls operate the equipment and the rear screen is of the flexible type. This media module has a screen surface 32 inches square and the entire unit stands 6'-8" high. Naturally, these dimensions will vary from module to module.

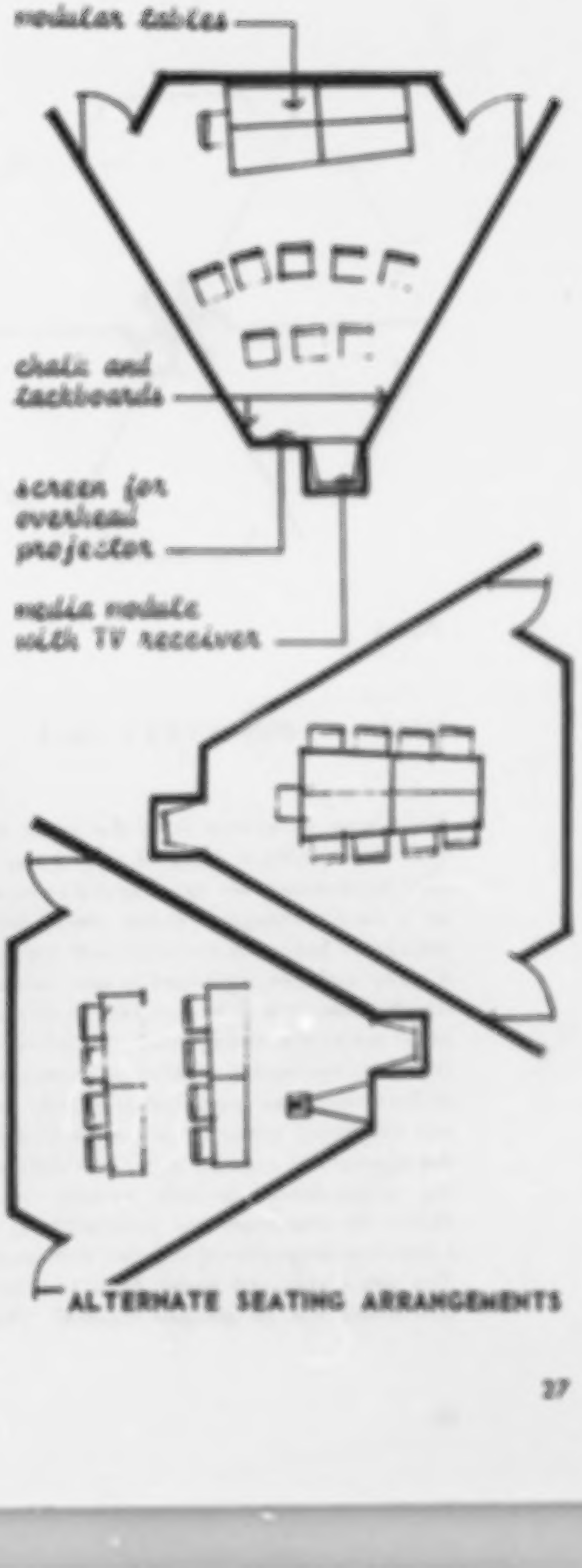


DETAILS OF MEDIA MODULE

SMALL-GROUP STUDY SG-2

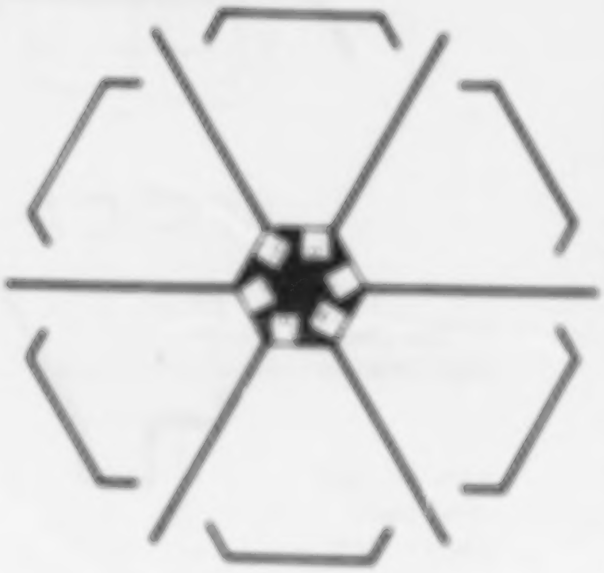
Wedge-shaped spaces can work well as conference and seminar rooms, and can also lend themselves to groupings for economy of space and circulation. Here three rooms, each based on an equilateral triangle and each planned with double access, a media module for slides or films, and an overhead projector are shown with different seating arrangements. In one, chairs can be grouped in circles or semi-circles, with the tables against the wall. For more formal presentations, chairs and tables can be arranged in rows facing the apex or media module. Finally, the tables and chairs can be put together in typical conference form. In any case, the seating occurs within the appropriate viewing area for the screens; the screens would have the characteristics of narrow viewing angle and high gain.

When several such rooms are clustered together, an equipment and service core is created. Media modules can be built-in or temporarily set in this core, utilising common wiring and power service.

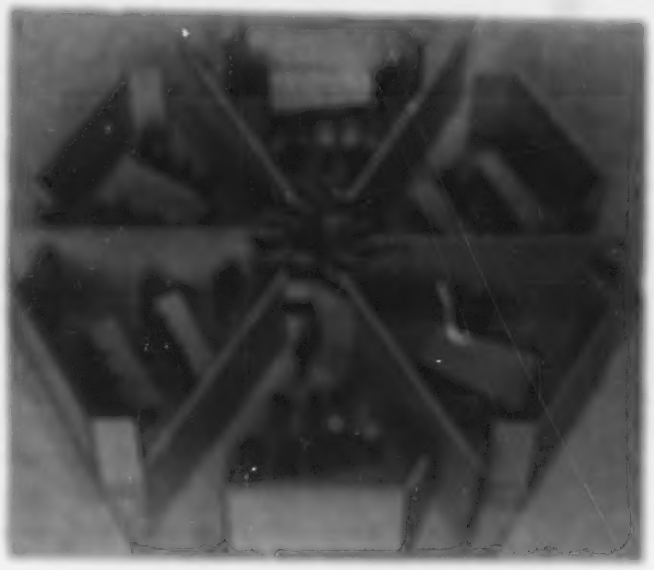


ALTERNATE SEATING ARRANGEMENTS

Groupings of rooms such as these would work well for seminars and conferences at the secondary and higher levels of education, and could also serve as project rooms. As elementary education programs move into nongradedness, some rooms of this type will find their way into the elementary school. Also, in a cluster of rooms of this type, one or two might be designated as teachers rooms or offices—probably with double occupancy—creating a "teacher office and seminar center."



PLAN



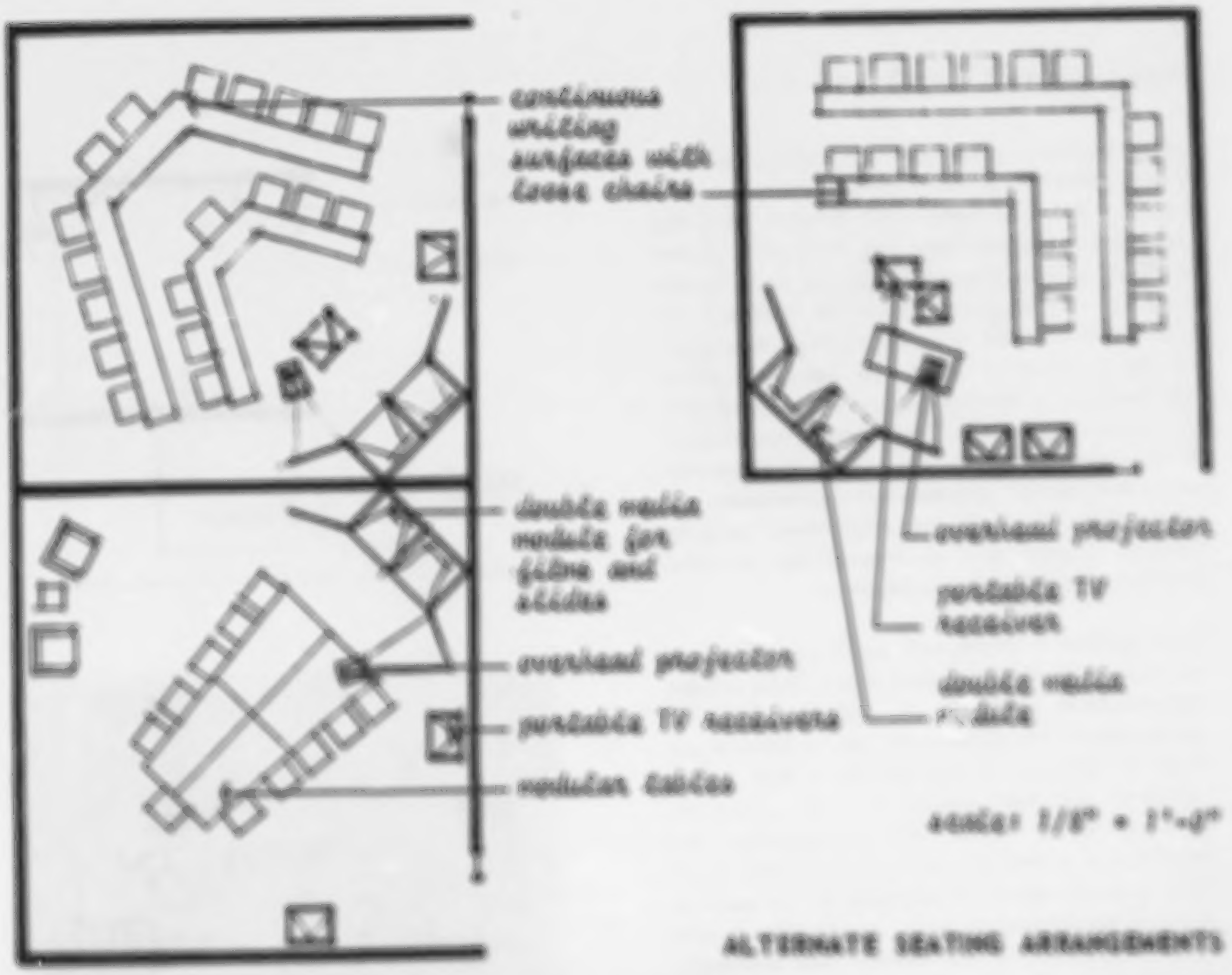
MODEL

SMALL-GROUP STUDY SG-3

When more extensive uses are made of media, and when multiple ways of displaying information are desired, the small group room will take on a more rectangualr shape. Here, three plans indicate a basic square room with the media and display surfaces organized in one corner, toward which students will be focused. In this relatively small room, the arrangement will allow for a TV receiver, two media modules or screen surfaces, a front projected overhead projector, and chalk and tackboard surfaces, all of which fall within the appropriate viewing area. The different seating arrangements include modular tables and chairs for rearrangement possibilities, and the horseshoe-shaped fixed counters with loose seats. The small plan and model show how such seminar rooms can be grouped together. Obviously, this basic plan is very adaptable to renovated and remodeled space. It shows that a corner orientation can make a square room appropriate for media, and economical of space.

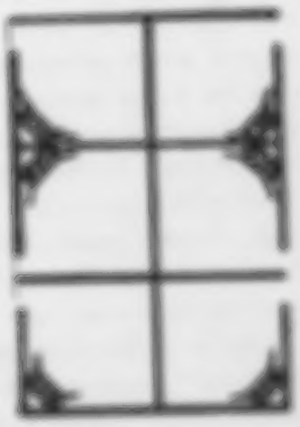
In these schemes, the pieces of equipment may be either fixed in place as built-in furniture or may be mobile units which can be moved from room to room and rearranged as the instructional situation demands.

This type of room seems most appropriate at the secondary and college level, and would likely be provided in banks or rooms loosely scheduled to allow "slack" for informal learning situations.


continuous writing surfaces with loose chairs
double media module for films and slides
overhead projector
portable TV receivers
modular tables
overhead projector
portable TV receiver
double media module
scale: 1/8" = 1'-0"

ALTERNATE SEATING ARRANGEMENTS

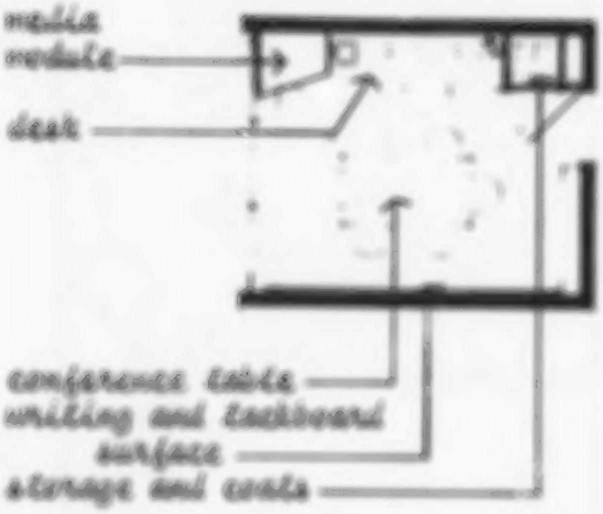
GROUP ARRANGEMENT



SMALL-GROUP STUDY SG-4

School teachers, even more than school students, need a place to call their own—an office, a work area, or least an individual cubicle. With the classroom becoming less and less used as the teachers' office, provision must be made for her somewhere else. Incorporation of teachers' offices are discussed in several places throughout the design studies. Here, the teacher's office also becomes a small-group conference and seminar room,—or a studio. This kind of room would be most appropriate in some kinds of nongraded curriculum where spontaneous conferences are encouraged, or where the educational program involves a great deal of counselling, personal guidance, and individual attention.

This teacher's office and small-group room is equipped with a media module for films, slides, and overhead projector. In addition, there are opportunities for chalkboard and tackboard surfaces in addition to the teacher's desk, filing cabinets, and coat space. In some instances, such an office could well accommodate two teachers, or a teacher and a teacher's assistant. This type of space, in addition to its applications at the secondary level, would offer a great deal of promise to the college and university designed to reintroduce personal contact between student and faculty.

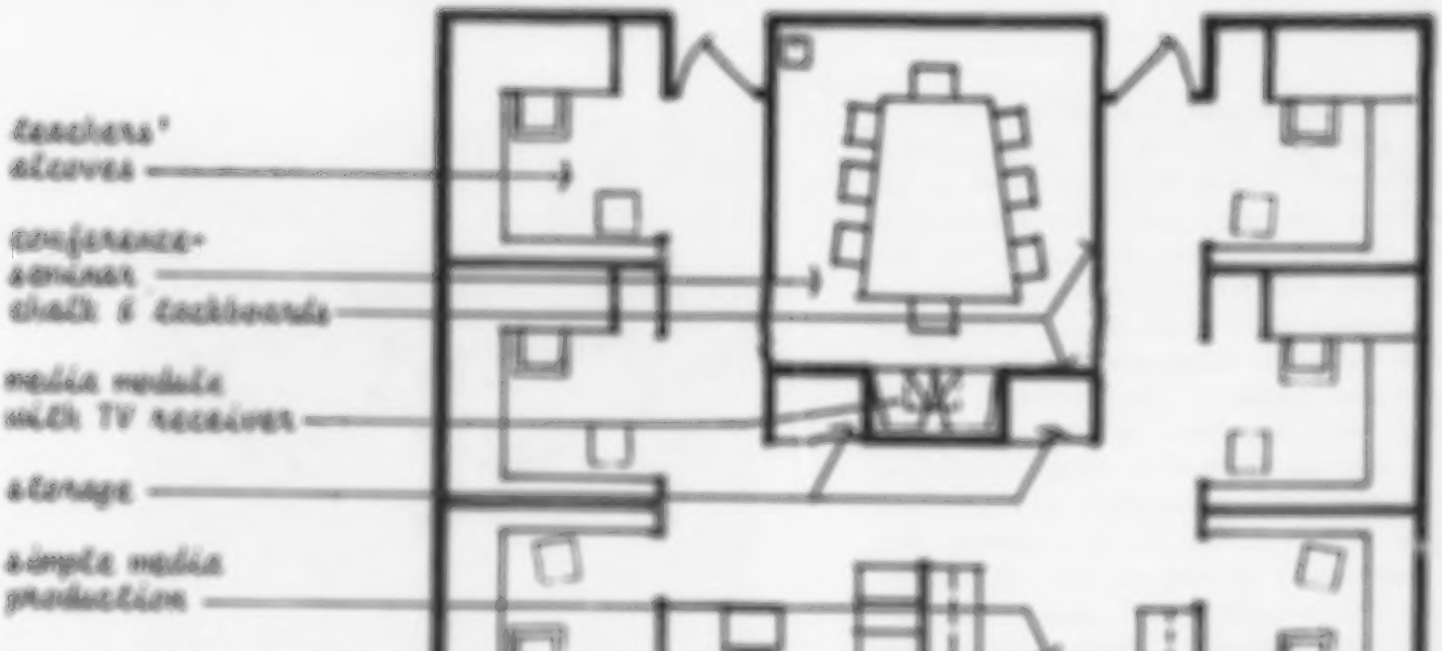


SMALL-GROUP STUDY SG-5

Another way to handle teachers' office space and small-group facilities is expressed by this scheme which places a series of teachers' cubicles or home bases around a small-group instructional space which can also be used for conferences. In this setting, the teacher is provided with basically a private space where she work, correct papers, prepare lessons, etc. When the time comes for conferences and small group teaching activities, she moves from her cubicle to a directly accessible, small-group room designed for these purposes. The small-group room contains modular tables with chairs that will form a variety of arrangements, focused on a series of information display surfaces.

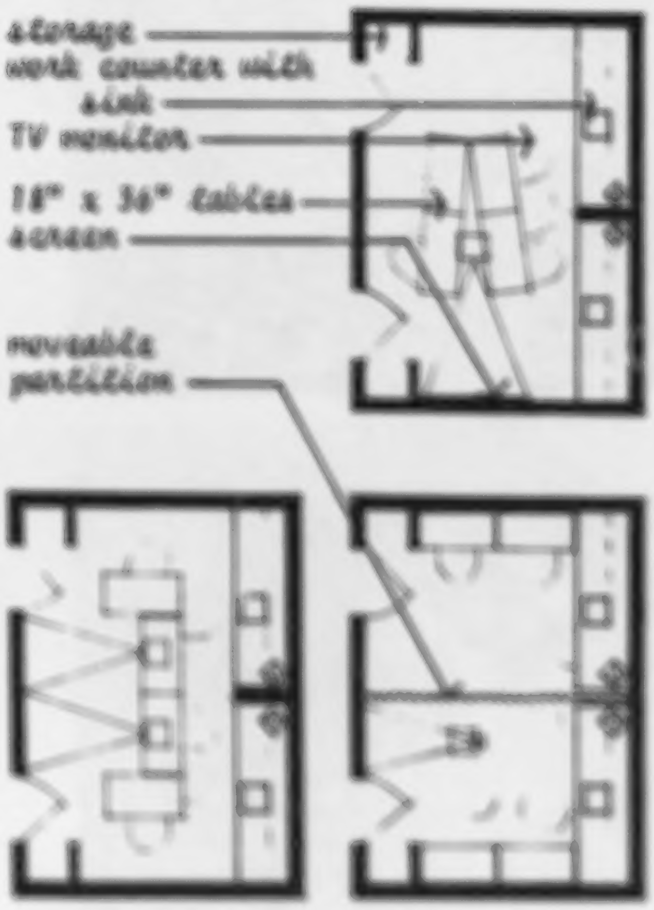
This type of space would also become the planning center for the team of teachers who occupy the cubicles surrounding the conference center. Thus, the small-group room becomes not only a teaching space, but a teacher's planning room. Such a suite of rooms could be assigned to each team within an elementary or secondary school plant. Further, if mobile equipment is used in the conference room, it will be possible to move the equipment on occasion to one of the teacher's cubicles for her own use in previewing and preparing class materials. Also, each teacher's cubicle would be provided with a TV receiver for monitoring off-the-air programs, and for other communication needs.

PLAN
scale: 1/8" = 1'-0"


teachers' alcoves
conference-seminar
chalk & tackboards
media module with TV receiver
storage
simple media production
secretary

SMALL-GROUP STUDY SG-6

In middle and secondary school programs, and particularly those geared to independent study, there arises a need for individual and small-group project rooms. These rooms, equipped with sink, services, and work space, and designed for the use of media are often employed in physical and natural science courses for independent and small group projects. The room permits a student or small group of students to conduct a project or series of projects over a period of time; work does not have to be terminated by the ring of the bell at the end of a class period. Such project rooms would normally be related to the appropriate laboratory facilities with storage and preparation rooms providing equipment and supplies. However, they could also be part of a resource center if the means of servicing them is available.



scale: 1/8" = 1'-0" PLAN

This study shows how two small project rooms may act independently for a group of no more than three students each, or how they may be opened together for small group activities involving six to eight. This degree of flexibility is certainly desirable in rooms of this size and function.

As a small project room, information display is handled either by TV receivers or by portable equipment with images being projected on the white plaster projection wall. When the partition is open, the modular tables are pulled away from the wall and, with the loose chairs, may be set up in a number of different ways. In the upper plan, the horseshoe arrangement will allow two images to be projected simultaneously on the projection wall and they can be used in conjunction with the TV monitor. In the lower plan, a larger image may be projected on a pull-down screen at the far end, and the remaining wall space becomes a writing surface. Of course, with the tables pushed back against the wall and the partition opened, a group of six to eight students all involved in the same type of project may occupy the room. The tables against the wall become additional work surfaces.

MG MEDIUM-GROUP FACILITIES

Even though the role of the medium size or conventional classroom has been diminished by many of the innovations in contemporary education, it is certainly logical to assume that rooms seating from 25 to 40 will continue to be needed and built. These design studies illustrate the basic design and planning considerations for rooms housing recitation and other medium-group activities.

In general, design and planning of medium-group facilities involves no complicated planning problems. Generally, basic tenets of viewing must be followed, but this usually involves simply arranging seating inside the viewing area defined by the size and location of projection surfaces. If, because of the seating type or complexities of furniture and equipment, sight lines become critical, then stepped flooring will be necessary (as in design studies MG–3 and MG–3). Otherwise, flat floors and simple ceiling configurations are quite satisfactory.

The general shape of the medium-group room is often a square or variations on it, either focused to a corner or focused to one side; in the latter case, the front corners become storage, preparation, or other adjunct facilities. Several different types and combinations of lighting systems will provide the two or three levels of light required, depending on the number and types of display systems being used. Generally, rear projection has been selected for these rooms, utilizing either a media module or a rear projection area.* The overhead projector is used on fixed or "swing-out" projection surfaces, which may also double as tackboard and chalkboard surfaces. Media modules may be either fixed or mobile, depending on the utilization of media within the room.

Furniture and equipment pose no special problems. With the wide variety in school furniture available, it is only up to the imagination of the architect and the resources of the school to make appropriate decisions.

Some studies in this group, and elsewhere in Part 3, are noted as appropriate for elementary and pre-school education. Here the size of the room will vary significantly based on the number of children, the learning methods involved, and any supplementary equipment required. Particularly in kindergarten and other pre-school programs, the square footage per student will be larger than necessary in typical elementary grades.

The four schemes that follow illustrate a recitation room; a lecture-laboratory for sciences; an audio laboratory for languages, drama, speech, and other communicative skills; and a multi-class room for the simultaneous teaching of groups in several related discipline areas.

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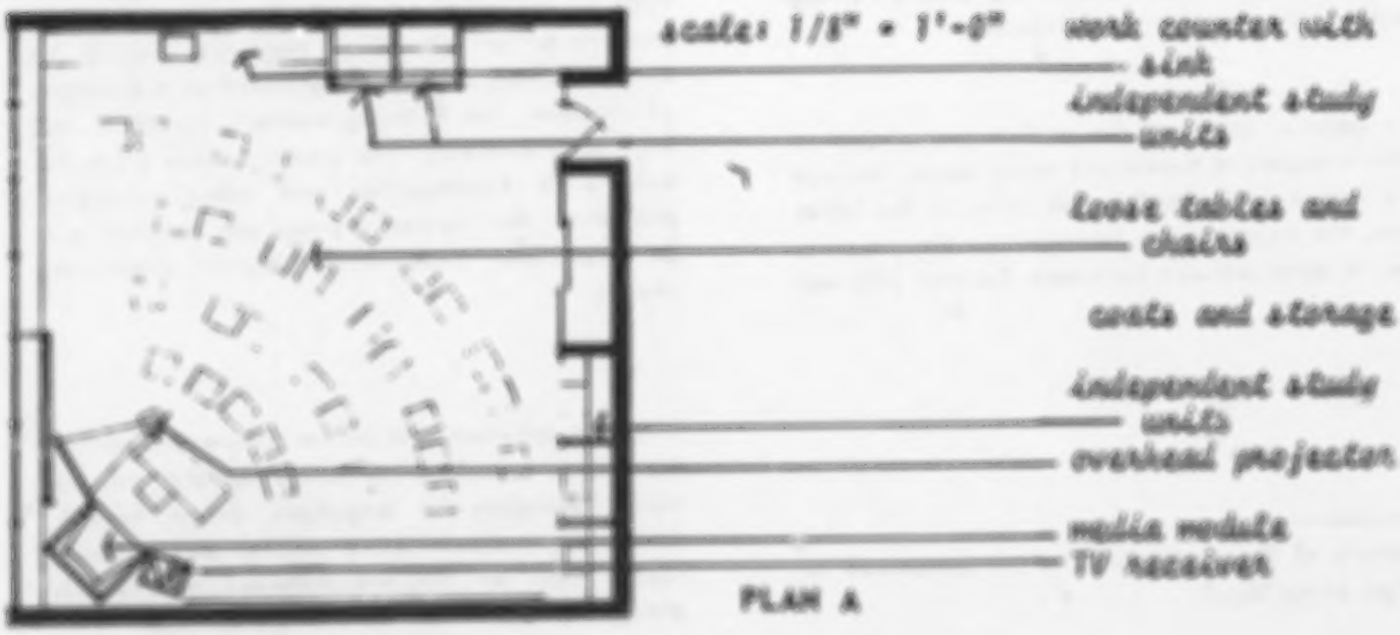
*Details of the media module are presented in design study SG–1.

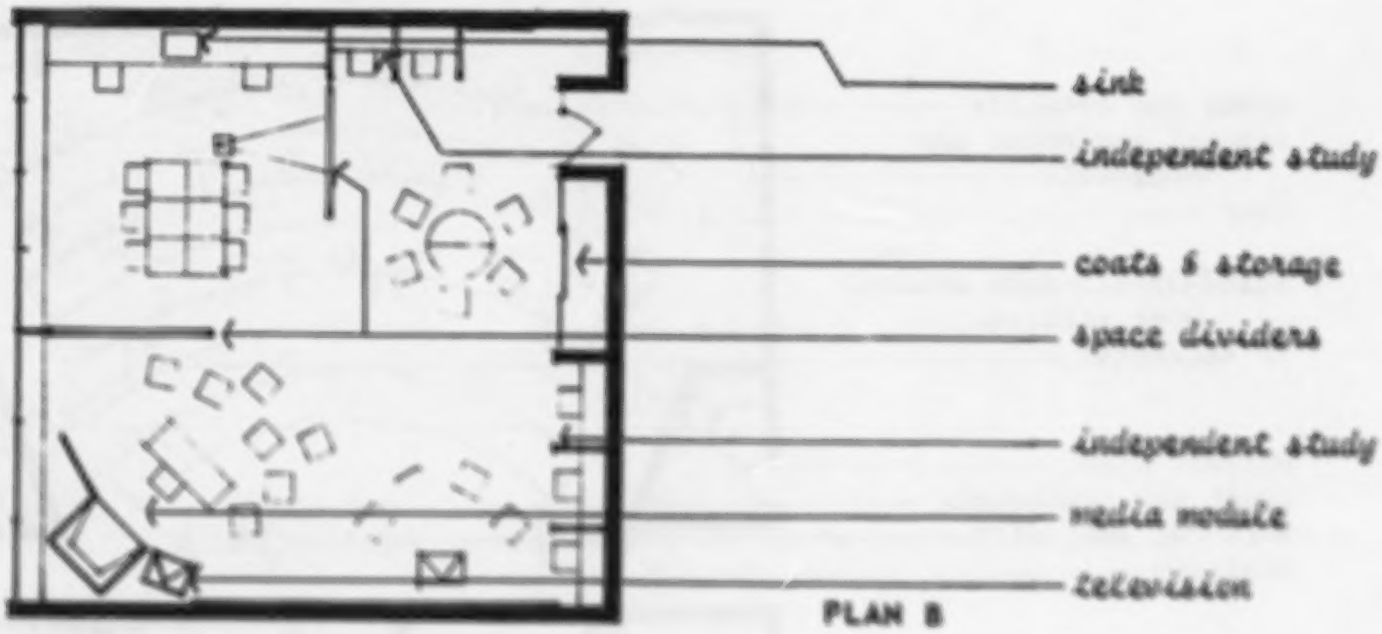
MEDIUM-GROUP STUDY MG-1

The basic point illustrated by this scheme is that a square room is the optimum shape for medium-group spaces. The 30–odd seats are oriented to a variety of display surfaces and types of media located in one corner of the room. This orientation, in a square room, best encloses an optimum viewing area as shown in the plan by the arrangement of the seats. Around the periphery of the room are located project areas, coat area, independent study stations, and supplementary display surfaces. By using the media module, windows on the one wall may be as extensive or limited as desired, although draperies or shades will be required behind the media area to prevent glare in the face of the viewers.

The other plan and model indicate how the room can be quickly reorganized into a series of small-group and independent study activities. The loose tables and chairs are reoriented in seminar fashion; one or two groups may use the media modules and TV monitors. In all groups, the use of the overhead projector is made possible by the media module screens and the swing-out space dividers.


scale: 1/8" = 1'-0"
work counter with sink
independent study units
loose tables and chairs
coats and storage
independent study units
overhead projector
media module
TV receiver

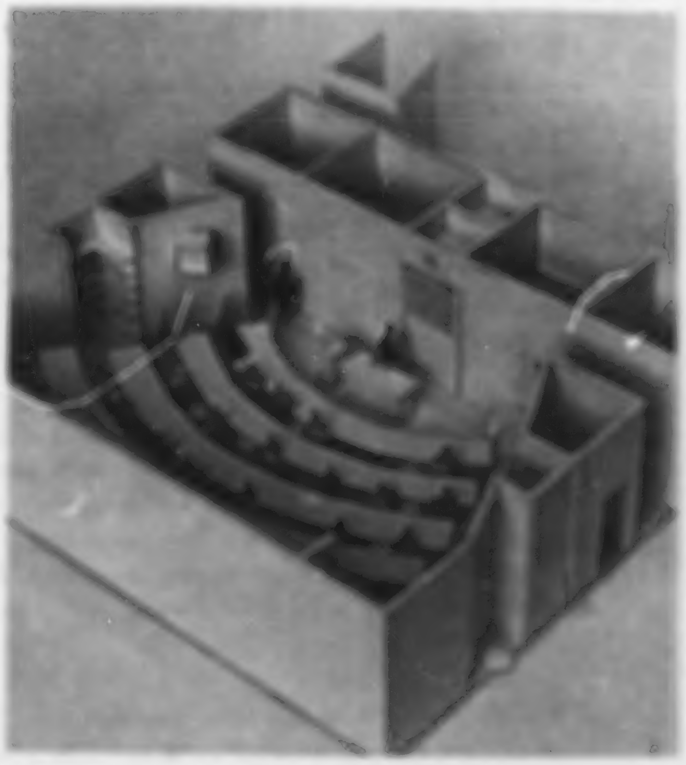
PLAN A



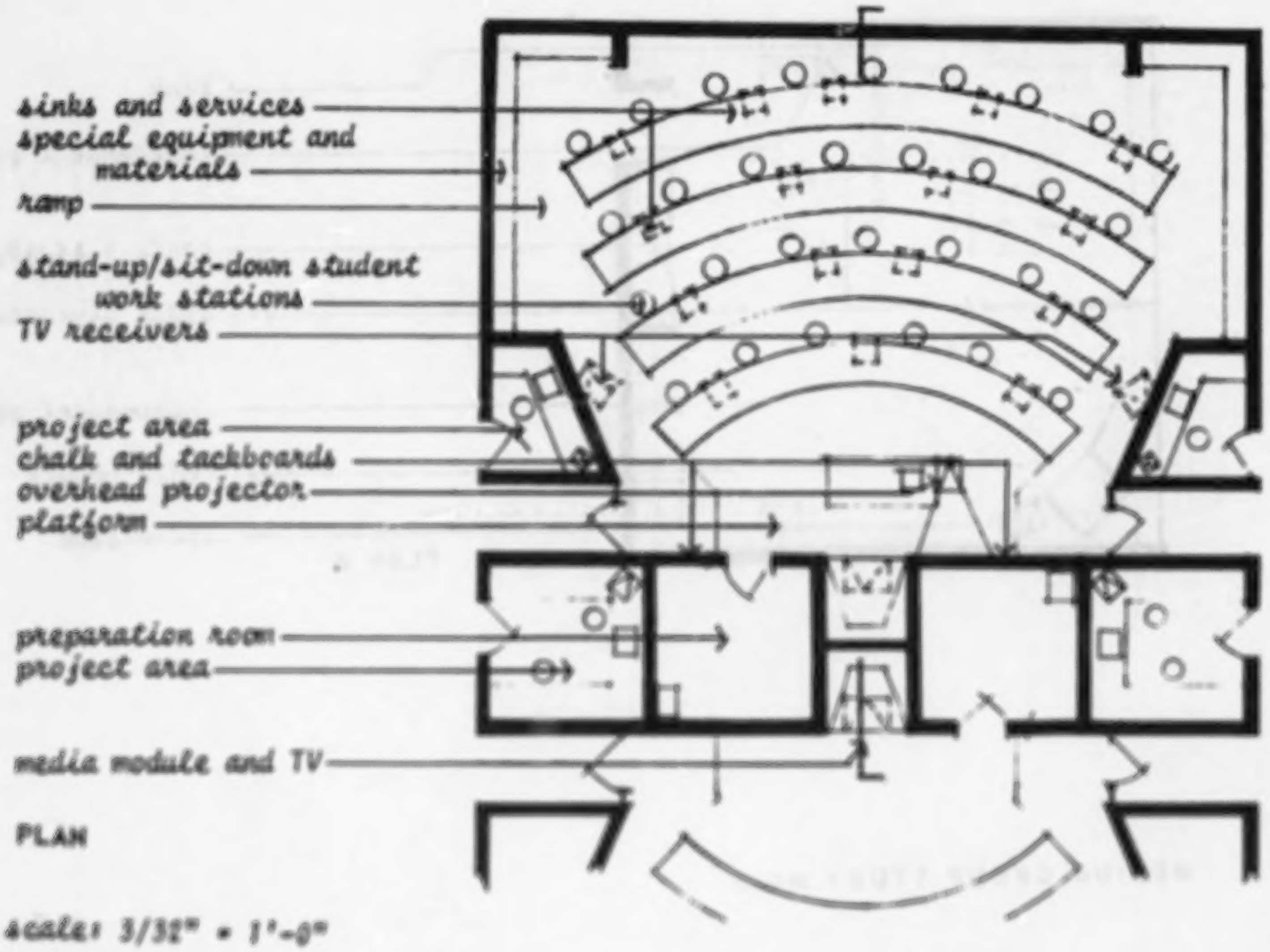
PLAN B

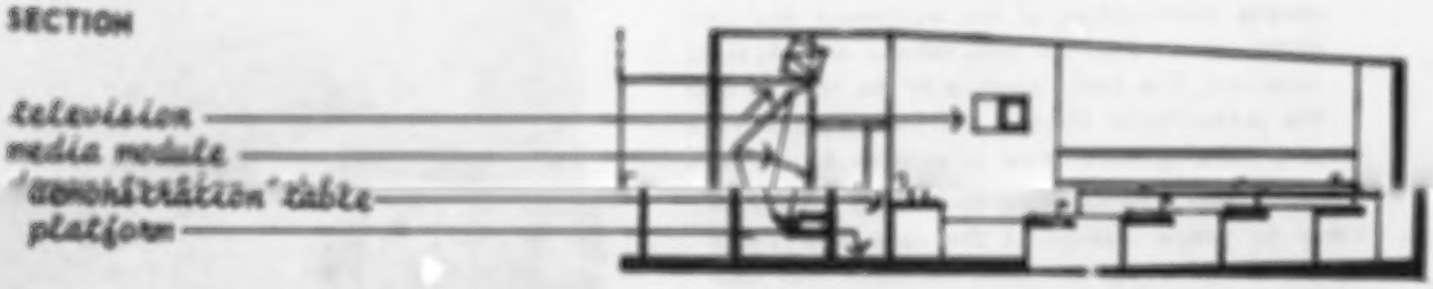
MEDIUM-GROUP STUDY MG-2

This is a medium-group science room, which by simple modification of the equipment and services can be used for both natural and physical sciences. The basic premise of the room is that the presentation phases and laboratory phases of a learning experience in science do not need to take place in separate facilities, but rather that by proper design of the room and proper provision of equipment both functions may take place interchangeably and sometimes concurrently.



This scheme shows a central core of facilities serving two science rooms "back-to-back." The central core contains preparation and projection spaces for each classroom, as well as project rooms. The front of the room contains a demonstration table which is backed by projection screens, a media module and supplementary display surfaces. Reagents and other supplies for student use are prepared and distributed


sinks and services
special equipment and materials
ramp
stand-up/sit-down student work stations
TV receivers
project area
chalk and tackboards
overhead projector
platform
preparation room
project area
media module and TV
PLAN
scale: 3/32" = 1'-0"


SECTION
television
media module
demonstration table
platform

from the preparation room by mobile carts moving up the ramped aisles. The student work station is composed of a large work surface, with sink and utilities serving every two students. The student has an option, as shown in the section, of either standing to work or sitting at the bench.

Although the square foot per student area in a room of this type is excessive when compared to conventional lecture rooms, the ability to save laboratory space by combining functions is both economically and educationally justified

The project rooms, which may be used by one or two students are provided for long term special projects and for advanced students. They may or may not be used by students who are a part of the group occupying the main part of the room.

MEDIUM-GROUP STUDY MG-3

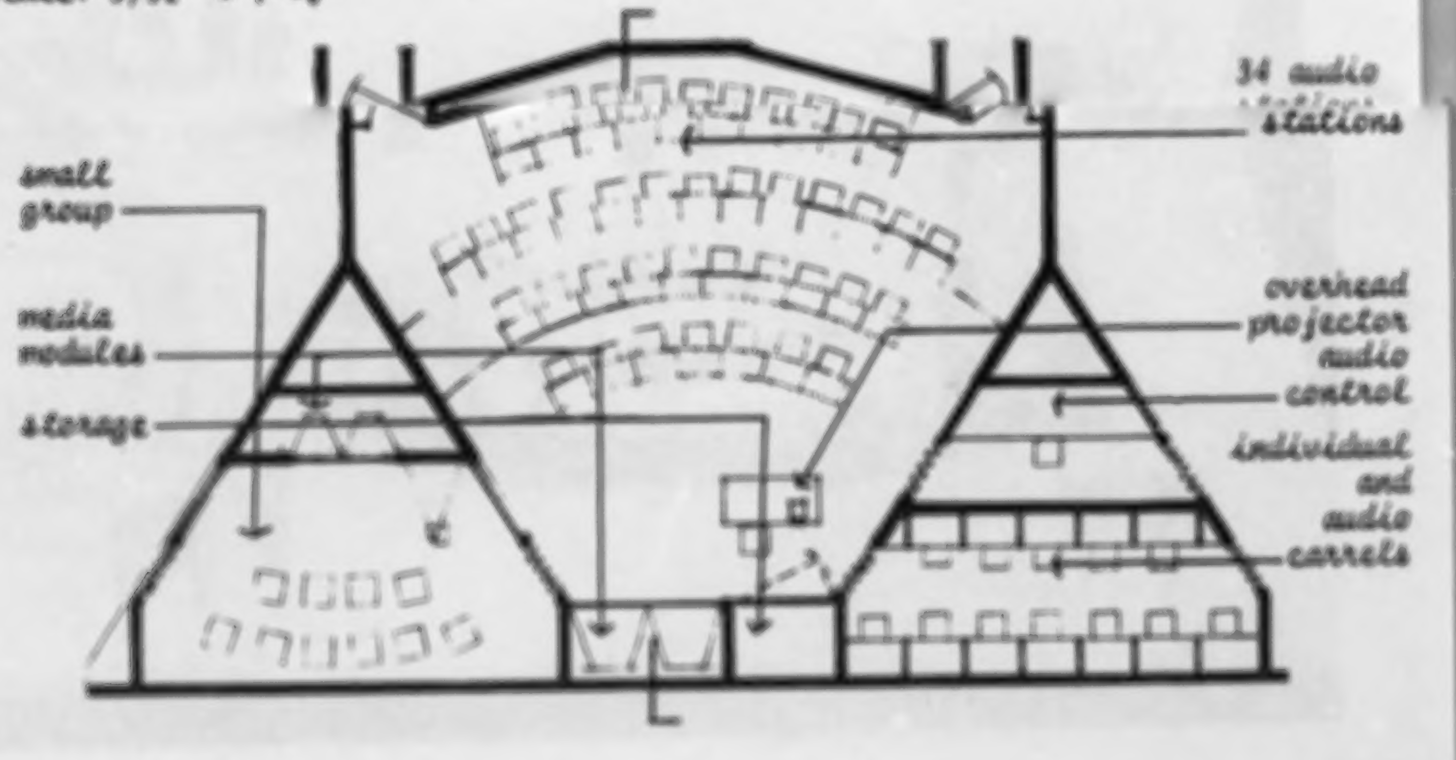
There seems to be little reason for creating rooms used solely for the teaching of languages. In essence, the so-called "language laboratory" is really an audio room which should be available for those aspects of drama, speech, history, music, as well as languages, which adapt themselves to audio presentation. Further, such activities may require some variations in group sizes, depending upon the instructional methods and organizational patterns. This scheme presents the concepts for a medium-group audio laboratory, plus an individual study area and small-group room. The audio system for all three types of space can be controlled from the teacher's control station.

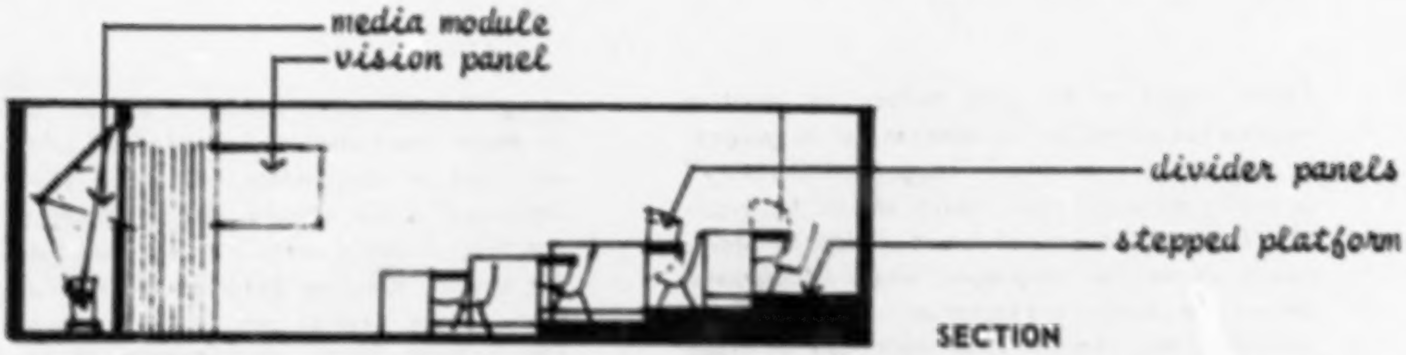
The 30–odd audio stations are grouped on a stepped floor and oriented to display surfaces for those times when audio and video information are used in conjunction with each other. The individual audio carrels, the small-group room, and the teacher's control station are located in the spaces occuring between the medium-group rooms when several are located side-by-side. The scheme shows development of an audio suite which allows the teachers to move freely through it from the control center.

The student stations in this laboratory could sometimes be considered as individual learning stations. Then, programmed instruction utilizing "machines" could be used at each station, or each station could feed into a central computer facility for computer-based individual learning.

PLAN

scale: 3/32" = 1'-0"

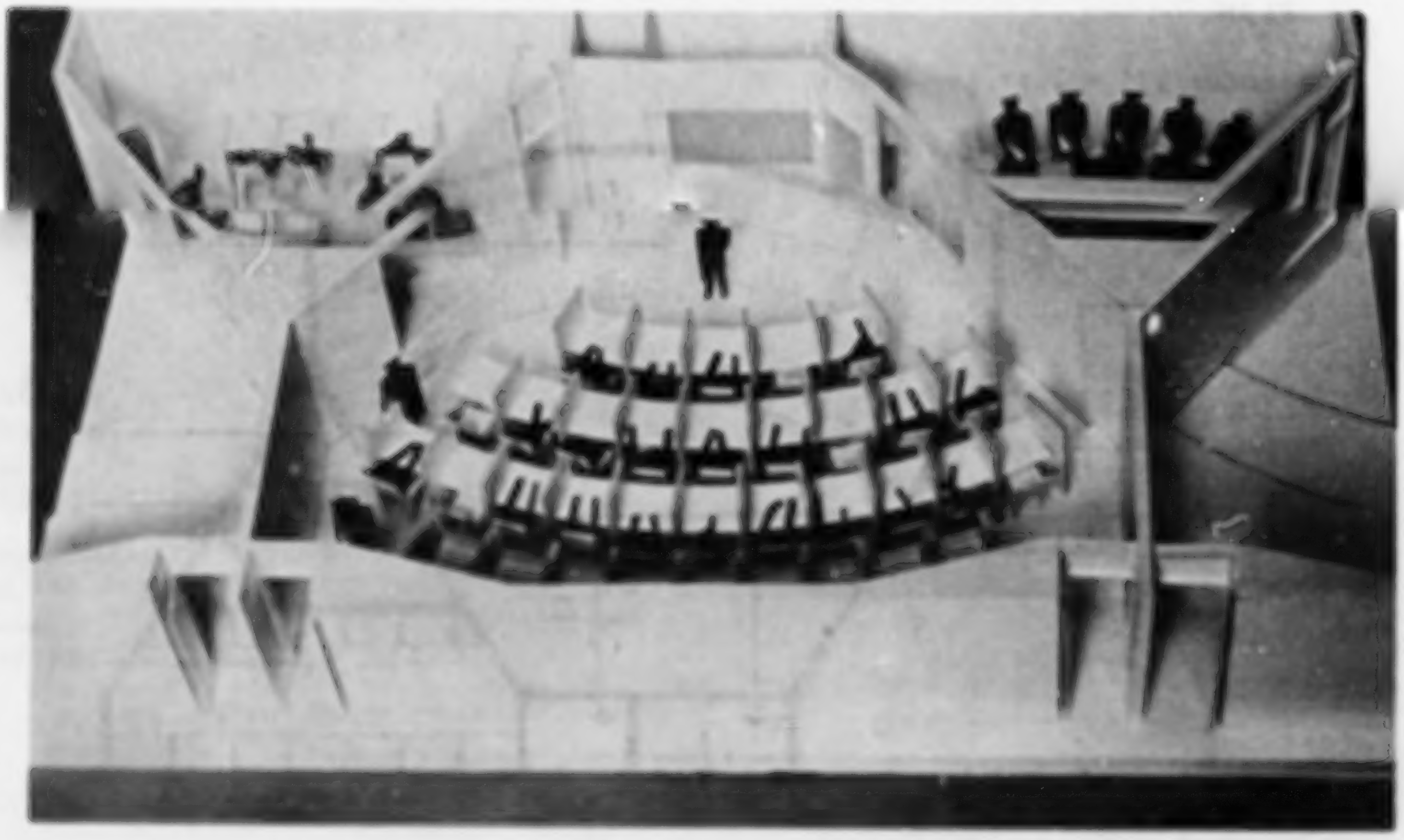




SECTION

The plan and section, and the photograph of the model, indicate the circulation pattern and the arrangement of furniture and equipment within the suite. The detail of the seating arrangement indicates that the lowering of the divider panel between student stations permits the group to function together, and may even encourage some interaction if it becomes appropriate.

Audio received in this room may be distributed from a number of sources—a central library, a central tape bank, remote locations away from the school, or tape decks within the suite. All of these possibilities should be considered and provided for in the selection and installation of the audio equipment and control system.



MEDIUM-GROUP STUDY MG-4

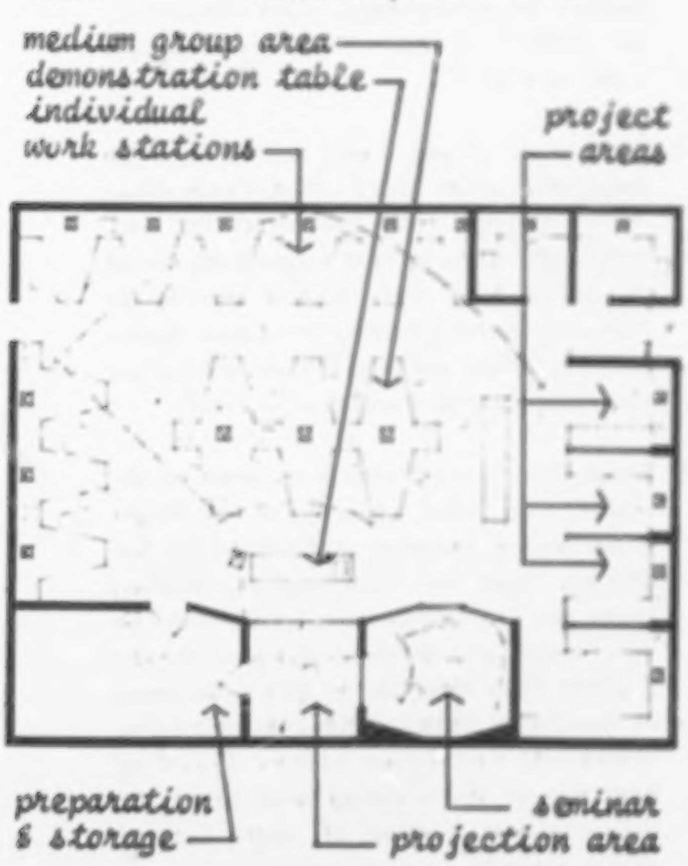
In many small secondary schools and colleges, student enrollments are not large enough to permit the offering of separate sections in a variety of related courses. For this reason, multi-class teaching has begun to play a significant role, and appropriate facilities for multi-class teaching are being considered. This design study presents a multi-class science suite utilizing a variety of media.

Within this multi-class room a medium-size group of students may be working together at the large central lecture–laboratory area, small groups of students may be gathered together in a project or seminar room, two or three students may be working together in the project areas, or individual students may be at work in a project room or at a lecture-laboratory station. The preparation room is located to supply and service the entire suite, while access and circulation within the suite allows the various functions to take place without interference.

Various types of projected media are available to the medium-size group working at their lecture-lab stations, as well as to the small group meeting in the seminar room. In the project rooms and independent study stations, television receivers, portable film and slide projectors, and the overhead projector introduce media as necessary in the learning situations.

In this type of multi-discipline, multi-class laboratory it is the use of media to extend the role and range of the teacher that permits such a setting to be justified and suitable for education.

PLAN *scale: 1/16" = 1'-0"*



LG LARGE-GROUP FACILITIES

It seems that the effectiveness of media in education has been tested most extensively in large-group learning situations. Certainly in the last ten years many public schools and a large number of colleges and universities have adopted large-group instruction using media for an increasingly large proportion of the instructional load. In fact, it is through the utilization of learning media that large-group instruction may become truly effective—by bringing to this type of learning system means for magnifying and displaying information, presenting information from a remote location, introducing information that otherwise would be impossible, and introducing information in a more demonstratively effective way.

There is a current re-examination of large-group instruction following on the heels of a general concern for more independent and individualized learning experiences. Even though there are proponents of each to the exclusion of the other, the logical solution for most institutions will be the incorporation of both types of learning experience—and indeed a variety of learning experiences in-between—and in turn the necessary facilities for their effective use. This "mix" of learning experiences is the basis for many organizational patterns, and is at the heart of the systems approach to designing learning.

For these reasons an examination of the planning of large-group facilities with media is essential, particularly because the design criteria and planning considerations in large-group facilities with media are probably the most critical of any type of space that might be provided. The following points summarize these design and planning criteria:

1. An optimum viewing area, as defined by the various display surfaces which are considered critical for student viewing, will determine the most effective room shape. This optimum area is not a fixed function of the combination of screens and/or monitors, but will vary with the type of material presented, the duration of the presentation, the quality of the equipment, the type of screen, and other factors of environment. (See Report C, for details of projection systems and viewing areas).

2. Stepped or sloped floors will always be required in order to provide optimum viewing conditions. Both horizontal and vertical sight lines in these rooms are major design factors. Also, raised seating introduces more intimacy in these rooms and may allow the interaction desired for case presentations and discussions.

3. Once the viewing area has been established, the actual capacity of the large-group space becomes a function of the seating type and arrangement. Seating types run the gamut from loose seats to fixed seats and built-in counters; Report C gives some attention to this wide range of available types. Whenever possible, aisles and circulation spaces should be kept out of the viewing area to assure the maximum number of seats located within optimum viewing conditions.

4. As long as the display of information and the use of media is a significant function in the large-group room, windows and natural light are a liability rather than an asset. Although means may be found for controlling natural light, the size of required images in the room mitigates against natural light with its inherent problems of control and "washed out images" caused by ambient light.

5. Complete climatic conditioning is necessary for this type of space by virtue of the number of students involved, the lack of natural windows and ventilation, and the concentration required by this type of learning experience. Such conditioning will include cooling, air change, filtration and humidity control.

6. Proper acoustical design, from the outset, is necessary for the successful functioning of this type of room. Not only should sound originating within the room be easily heard by all students, but the space should be thoroughly acoustically isolated from interfering sounds from the outside.

7. Likewise, the planning of lighting is an important consideration. Generally, three levels of illumination will be necessary for the display methods used in these spaces; control of ambient light on projection screens is likewise essential. Report C discusses these criteria in more detail.

8. Because lighting, acoustics, and climatic conditioning are such critical design features in the large-group room, their integration and design must be considered from the outset. Too often this kind of space suffers badly from neglecting these design features until too late in the planning process.

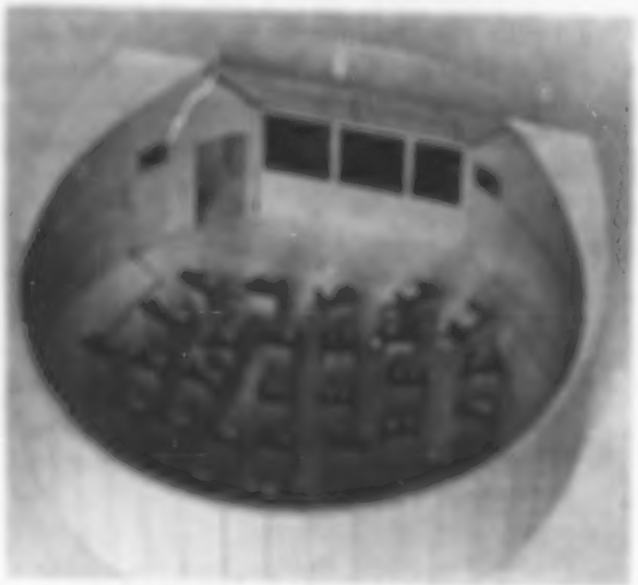
9. Educationally, the key to the proper functioning of this type of space is the integration of the systems for displaying information and other media uses. The studies which follow illustrate the fact that the display surfaces are an integral part of the room, and that equipment should be located for proper functioning and not to interfere in any way with the process of learning. This consideration includes the location and planning of the teacher's lectern or control center, and suggests that lighting and equipment be tied in and controlled from this lectern.

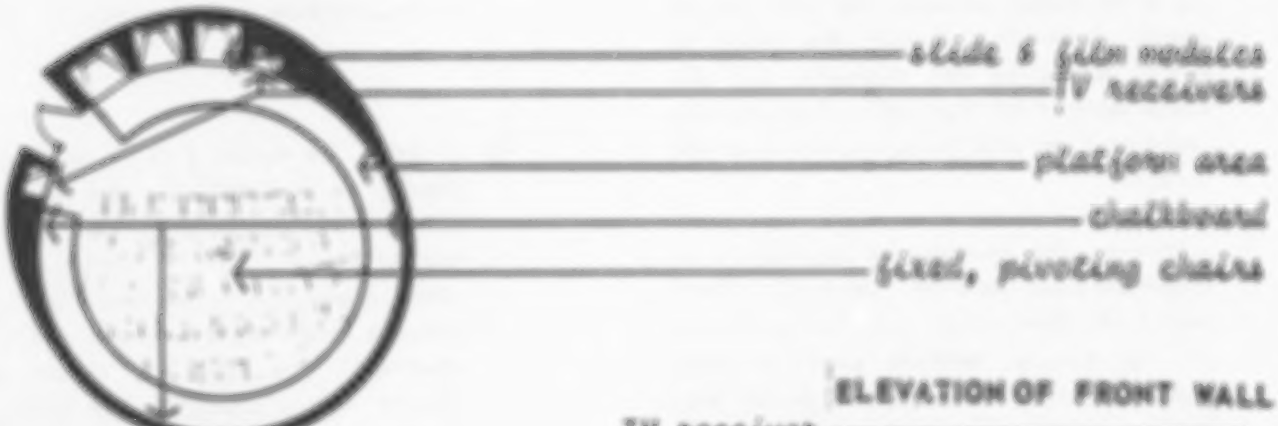
10. Finally, the success of these rooms will depend on the inclusion and relationship of adjunct storage, projection, and preparation areas. This is particularly true when rooms are to be used for science courses requiring equipment and demonstrations. In addition, these adjunct spaces may include project areas, conference rooms, and other smaller-group activities used to complement large-group presentation.

Large group instruction is sometimes criticized for being impersonal and lacking feedback and interaction between teacher and student. The use of student response systems can begin to put back into the instructional process an immediate indication of successful communication between teacher and student and can help make both instruction and learning more effective. The large group studies that follow would all be appropriate for such response systems.

LARGE-GROUP STUDY LG-1

This room is designed for 30 or more students with opportunities for displaying information which completely encircles the seating area. The 360-degree display surface consists of three media modules, TV monitors, overhead projection screens, and a large expanse of chalkboard and tackboard area. This concept of information display would be particularly appropriate in expository or developmental processes which are part of instructional techniques in science and mathematics; as the presentation or development of information takes place around the perimeter of the room, the students rotate in fixed, but pivoting, chair units.



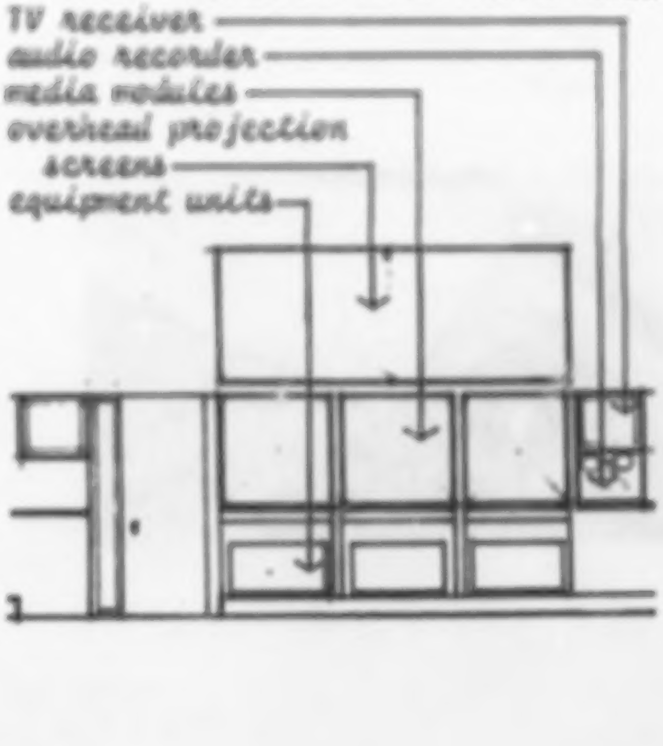

slide & film modules
TV receivers
platform area
chalkboard
fixed, pivoting chairs

PLAN

scale: 1/16" = 1'-0"

This kind of large-group room could exist by itself, or more likely, it would be surrounded by complementary discussion, seminar, and independent study areas. The most significant drawback is that the rotating seats will require a larger square-foot area per student than normal unidirectional seating.

ELEVATION OF FRONT WALL

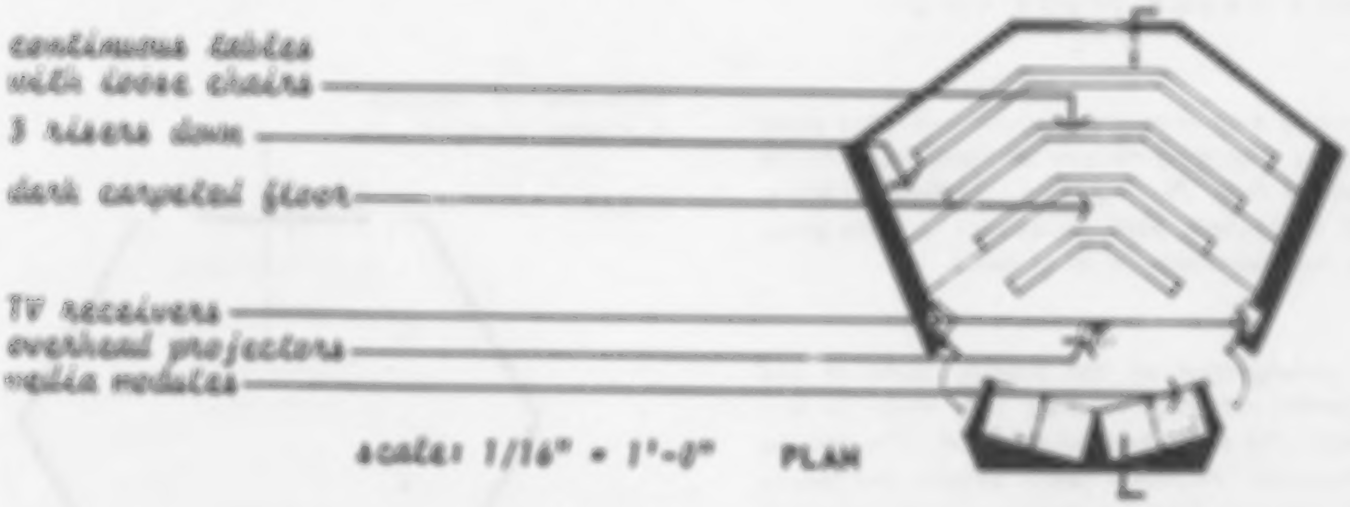

TV receiver
audio recorder
media modules
overhead projection
screens
equipment units

The elevation of the front of the room shows the large variety of media potentially available for use in the room. The platform around the perimeter can be used by the instructor, and is important in providing adequate sight lines from the students seated on the flat floor.

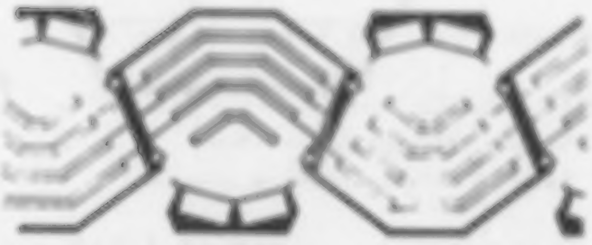
LARGE-GROUP STUDY LG-2

For a directional large-group room in which extensive uses of media are demanded, this study introduces some planning concepts. The plan and section indicate the variety of media modules and other display surfaces which are available within the room. All students in the space fall within an appropriate viewing area for all of these information display surfaces.

The seating is indicated as loose chairs located behind continuous counter tops. The horseshoe form of the seating begins to introduce interaction among the students as well as between students and instructor. In addition, the horseshoe arrangement permits a demonstration center at the front of the room. This form, too, requires relatively large square-foot areas per student.

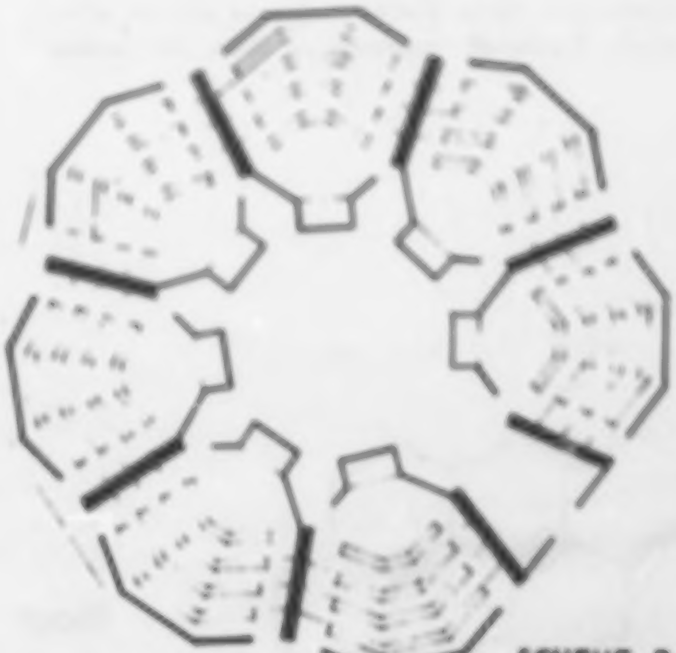


scale: 1/16" = 1'-0" PLAN



SCHEME A

The small sketch plans indicate how several rooms of this type might be arranged together. Scheme A shows they might be "strung-out" in a linear pattern and Scheme B indicates that they can be positioned in a circular shape around a central preparation area. In the latter scheme, this preparation area would be accessible from the front of each room, and would be particularly appropriate if used for science courses requiring this adjunct kind of space.

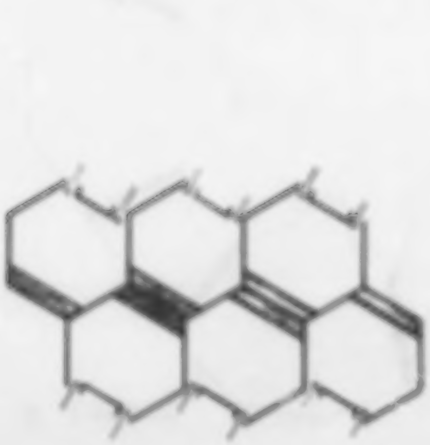


SCHEME B

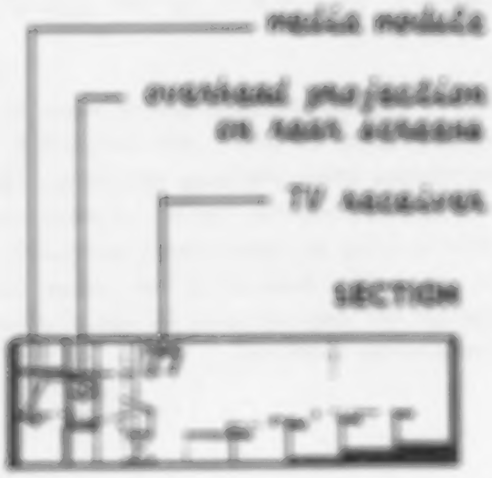
LARGE-GROUP STUDY LG-3

Somewhat similar to the previous one, this study presents a room which may be expanded to house anywhere from 30 to several hundred students. This particular study illustrates a large-group room for approximately 60 students.

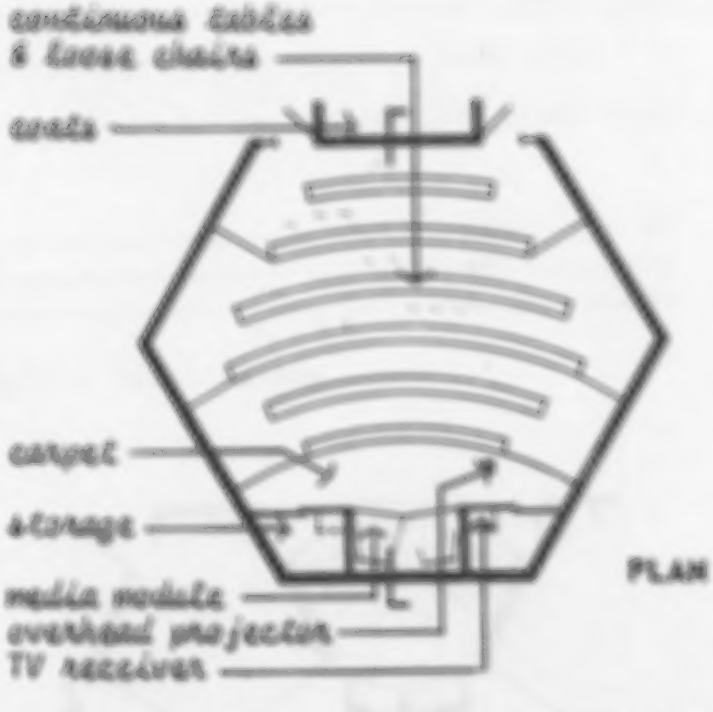
The arrangement of the display surfaces and equipment dictate a viewing area which in turn becomes the basic form of the room. The seating is arranged as loose seats behind continuous table tops and, like the previous study, there are no aisles in the viewing area. The small scheme shows how these kinds of spaces may be effectively clustered if several of them are needed.



GROUP ARRANGEMENT

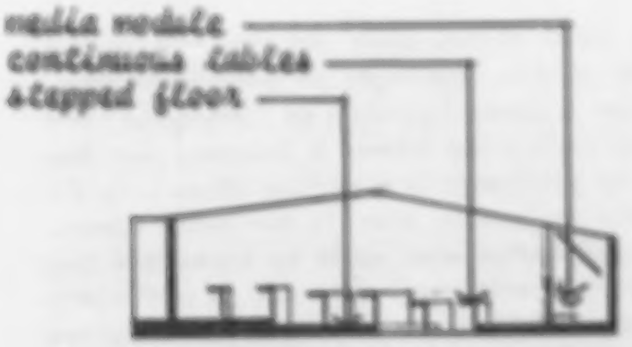

media module
overhead projection on rear screens
TV receiver

SECTION


continuous tables & loose chairs
seats
carpet
storage
media module
overhead projector
TV receiver

PLAN

scale: 1/16" = 1'-0"


media module
continuous tables
stepped floor

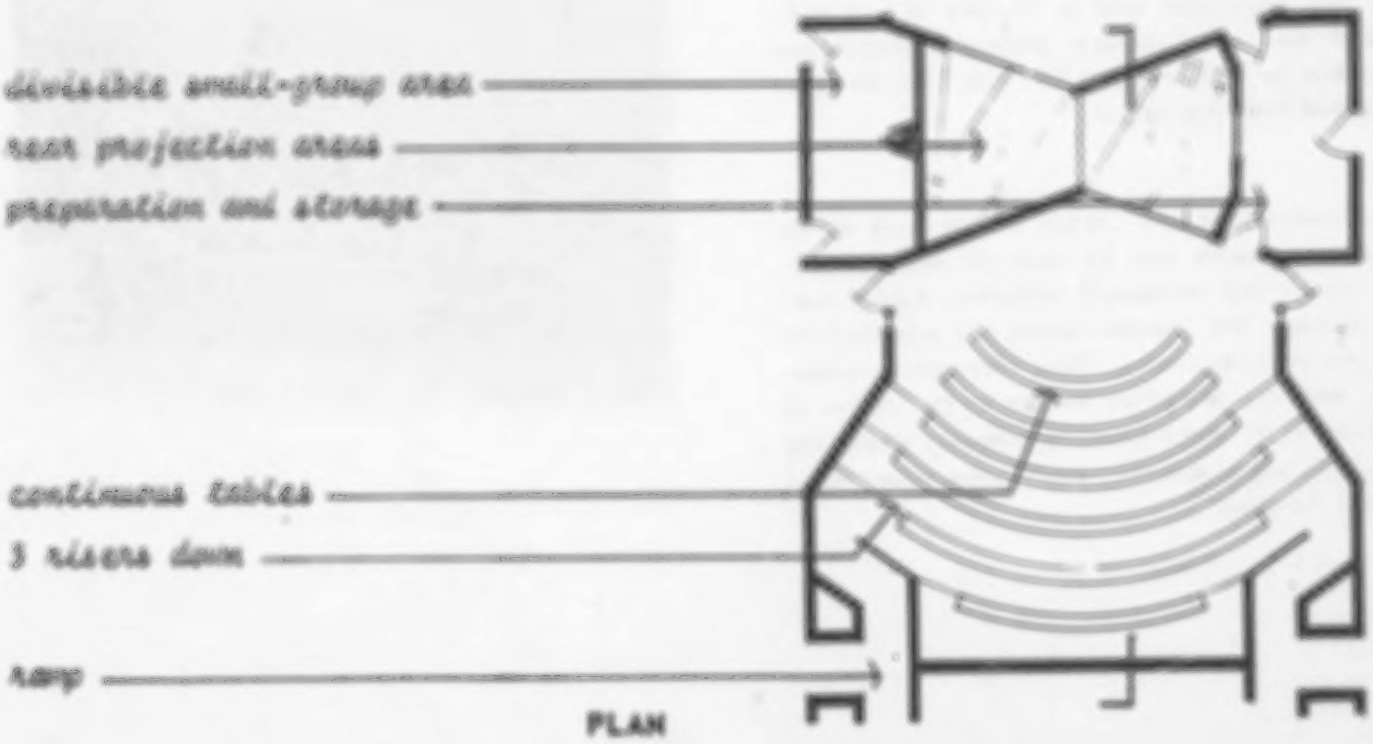
SECTION

LARGE-GROUP STUDY LG-4

This study is for a group of 75 or more students, is basically rectangular in form, and indicates how two rooms of this type may be logically placed "back-to-back" resulting in better handling of projection and preparation areas for both.

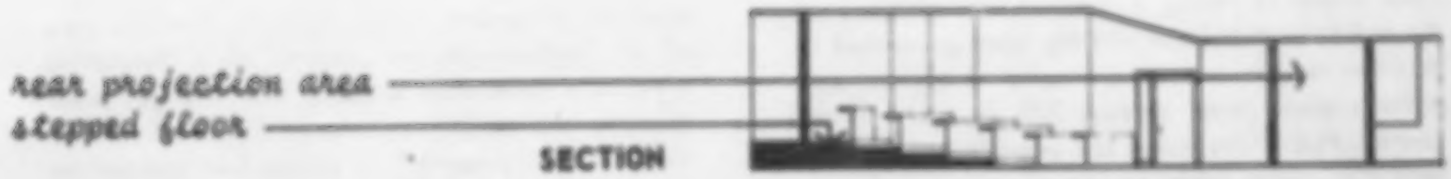
The basic plan and model show projection surfaces in the front of each room, half of which are for rear projection, the other half for front projection or chalkboard. This combined front and rear projection scheme provides a wide variety of opportunities for introducing media into the large-group room.

The plan indicates loose seats behind continuous countertops in horseshoe form. Based on the viewing area defined by the projection surfaces, however, the actual kinds of seating may vary significantly. Countertops may be straight, seating may be loose, fixed, or riser-mounted on the stepped flooring. Even loose tablet-arm chairs may be provided on the platform steps.

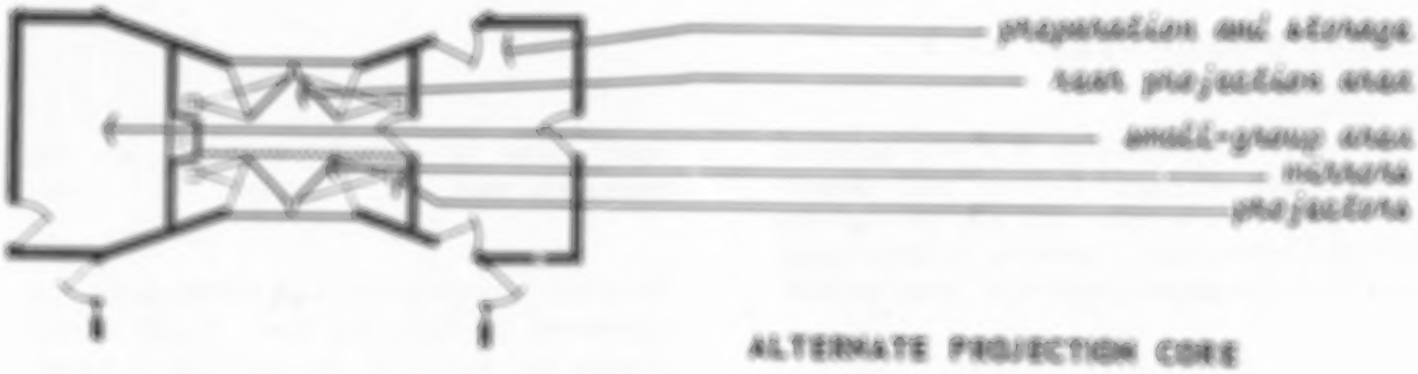

divisible small-group area
rear projection areas
preparation and storage
continuous tables
3 risers down
ramp

PLAN

scale: 1/16" = 1'-0"


rear projection area
stepped floor

SECTION



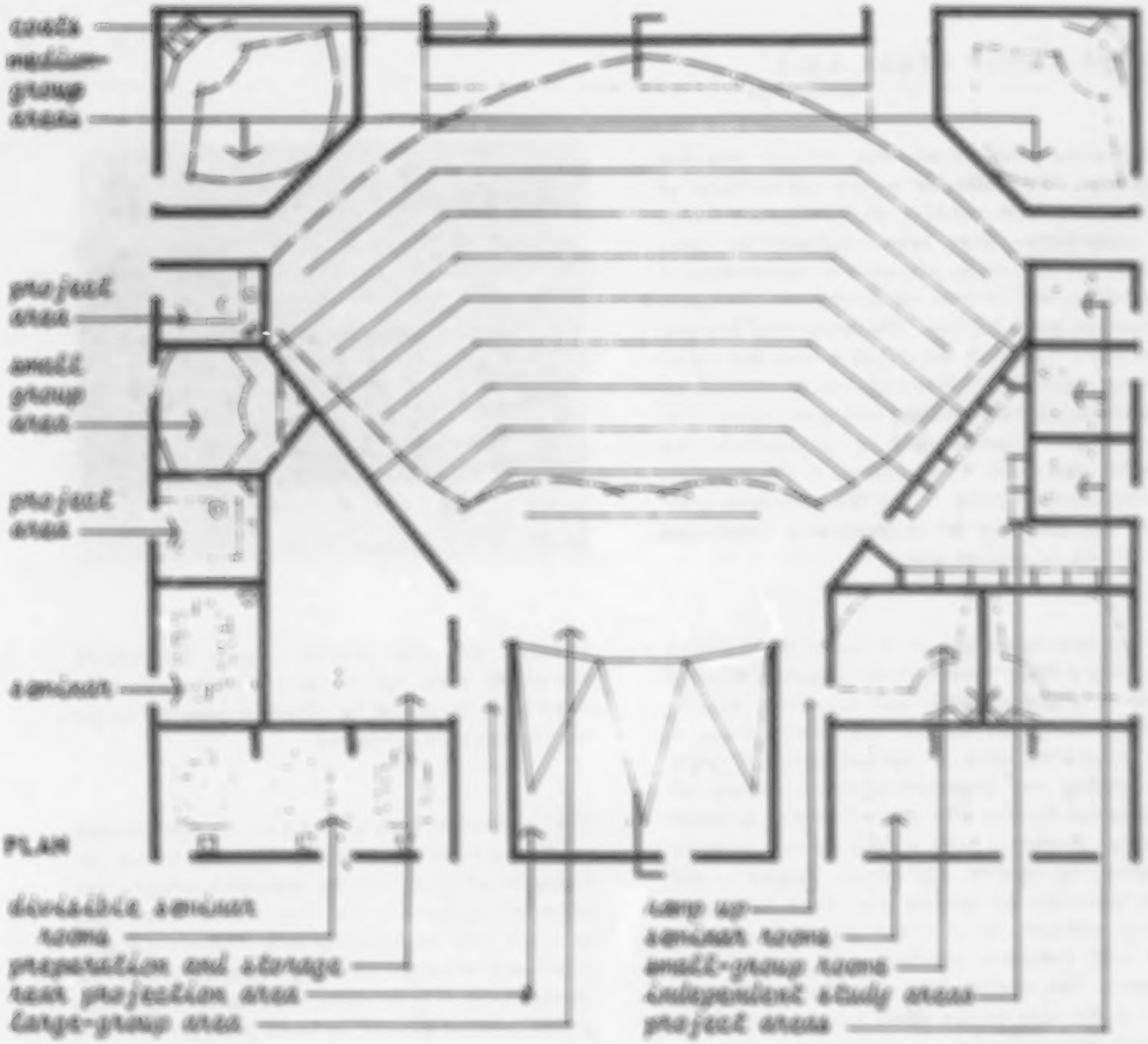
ALTERNATE PROJECTION CORE

An important feature of this study is the service "core" which provides projection services to both rooms. Also in this core is a preparation and storage space, and a small seminar room for team projects, small-group meetings, or other complementary uses. The alternate core plan shows another way of handling these functions. The rear projection area is divided in half and, through the use of mirrors, projected images are available in both rooms. TV, too, can be rear-projected from this space.

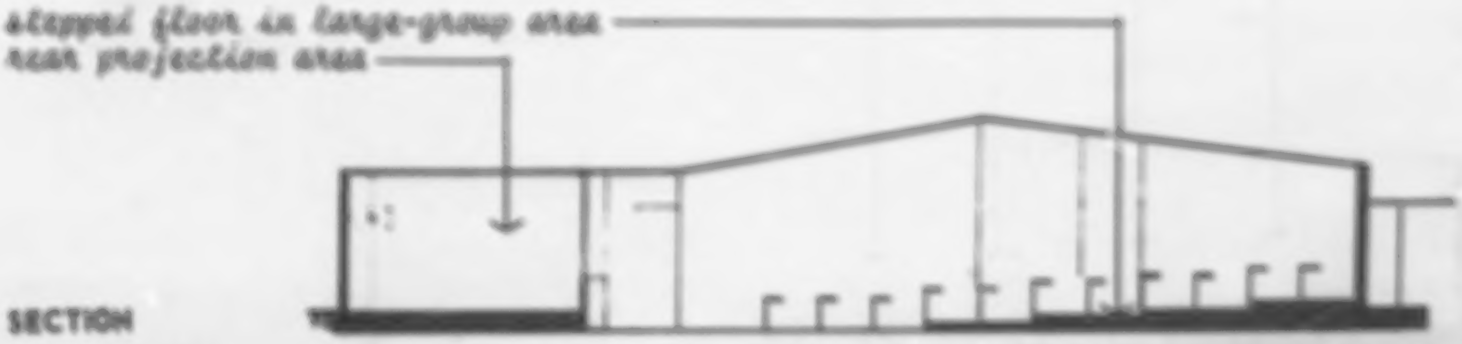
The "non-rear-screen" areas in the front of the large-group rooms may be used for front projection, chalk and tackboard surfaces. Again common storage and seminar areas are provided for the use of both rooms. This alternate arrangement, with the projected images in the center of the front wall, lends itself to schemes where the room seating capacity may range upward of several hundred.

LARGE-GROUP STUDY LG-5

This study is really a combination of many of the schemes that have already been presented in this section; it indicates a suite of spaces with a large-group room seating 300 students at its center. Within the suite are provided a range of facilities from large to small group and from seminar to individual project rooms. Such a combination of spaces could logically form the core of a "school-within-a-school" or a discipline area in a secondary school. The storage, preparation, and projection spaces can also be considered as "support" or production spaces for media as utilized throughout the entire suite.

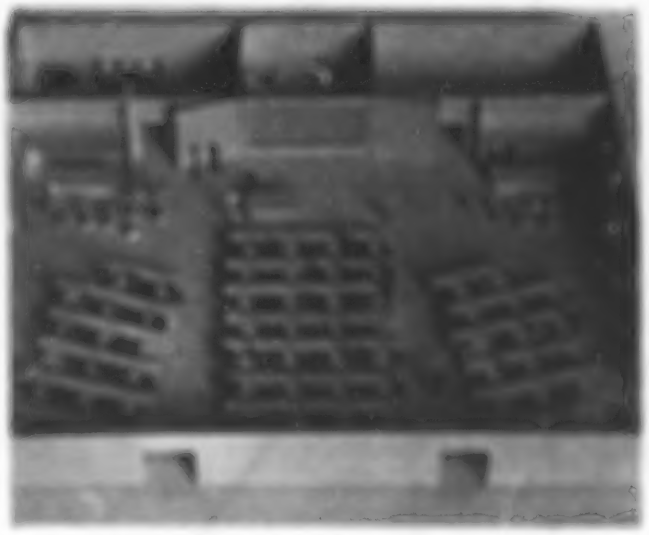

coats
medium-group areas
project area
small group area
project area
seminar
PLAN
divisible seminar rooms
preparation and storage
rear projection area
large-group area
ramp up
seminar rooms
small-group rooms
independent study areas
project areas

scale: 1/16" = 1'-0"


stepped floor in large-group area
rear projection area
SECTION

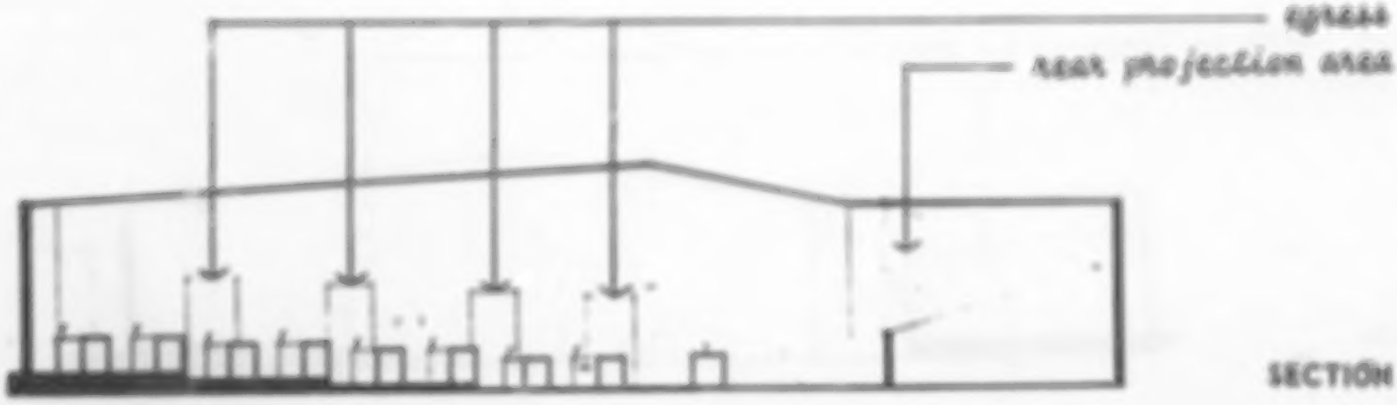
LARGE-GROUP STUDY LG-6

Large-group instruction can include learning functions other than the simple presentation of information. Manipulative and laboratory types of experiences have been employed for many years, and this study suggests a combination of laboratory and lecture–demonstration functions within the same facility. The resulting "lecture-laboratory" permits the experimental and information presentation functions to be carried on simultaneously and without changing rooms. The advantages of being able to demonstrate and present information to a group of students seated at laboratory stations is one that may help overcome the problems of amalgamating media and instruction in science areas.

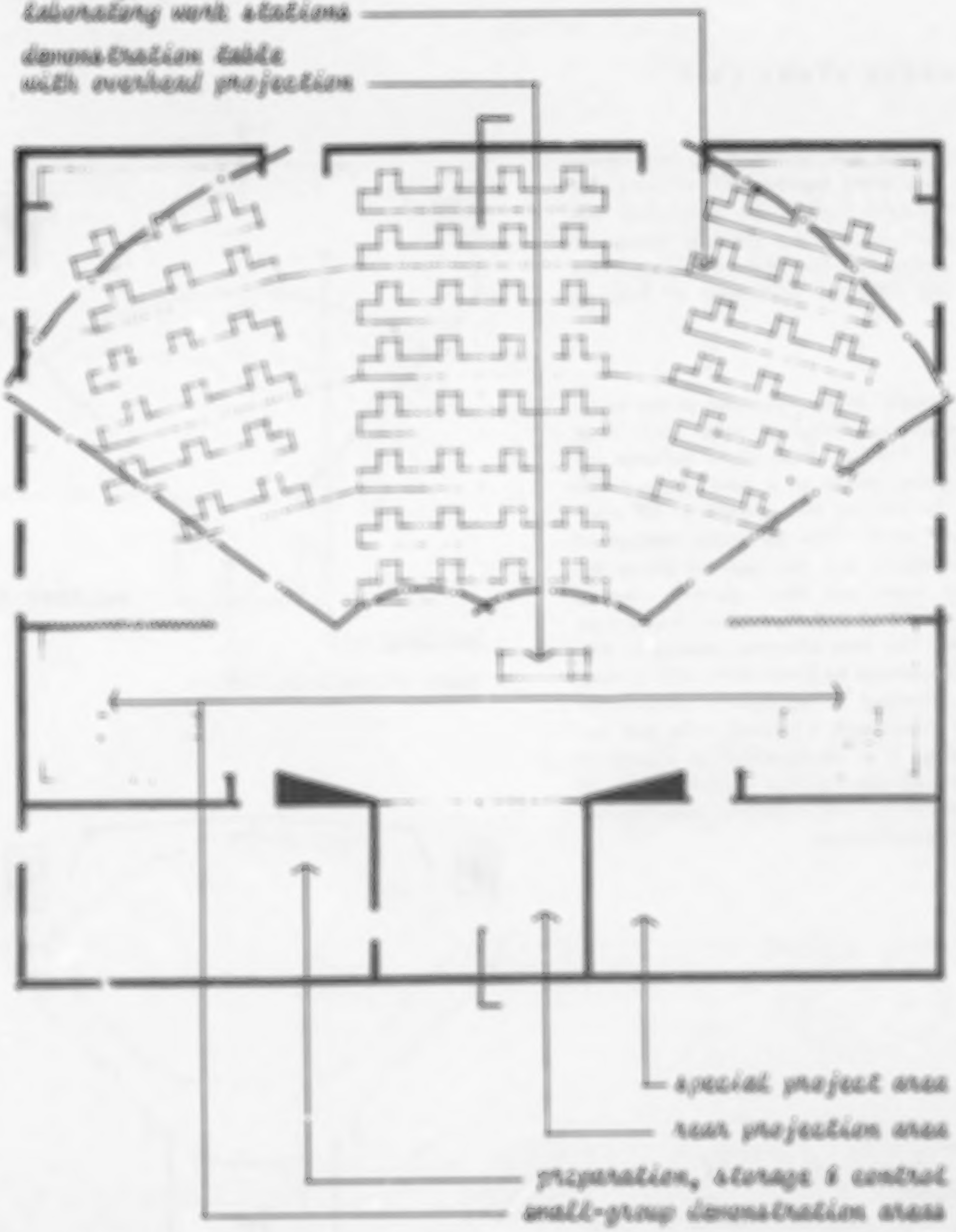


The lecture-laboratory is a suite of facilities including a large area containing over a hundred student laboratory-desk stations, two smaller demonstration and special equipment areas, a rear projection area, a special projects room, and storage and preparation space serving all parts of the facility. The student area is arranged on three platforms with a ramp at one side for wheeling in special equipment, reagents, and other materials for student use. Each laboratory station consists of a stand-up, sit-down work area with complete utilities serving every two students. The smaller demonstration areas in the front of the room permit small groups of students to work more intimately as a team or with an instructor, and also provides space for special equipment used by students during laboratory exercises; these can be shielded from the larger area by movable partitions.

The projection area allows two ten-foot images to be projected simultaneously, and further information display can be provided through two overhead projectors. The front of the room also provides area for demonstrations which are prepared and supplied from the adjacent work and storage room. These types of demonstrations will probably be magnified by closed-circuit TV and projected on the rear projection screen.



SECTION



stand-up/sit-down laboratory work stations

demonstration table with overhead projection

special project area

rear projection area

preparation, storage & control

small-group demonstration areas

PLAN

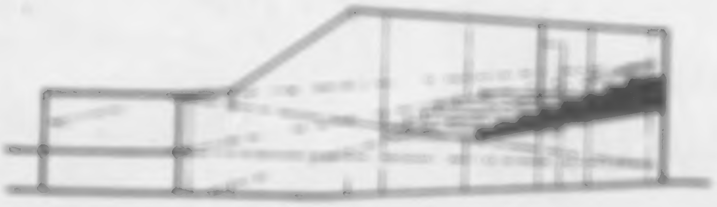
scale: 1/16" = 1'-0"

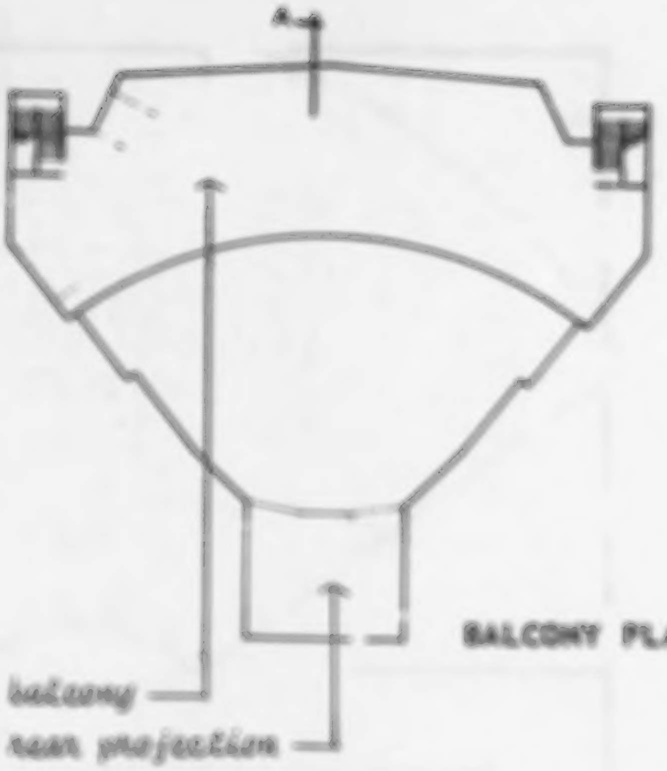
LARGE-GROUP STUDY LG-7

In larger colleges and universities, large-group instruction may bring together 600 or more students in a single facility for instruction and presentation of information. Even in spaces of this size, appropriate facilities will permit the extensive and effective utilization of learning media.

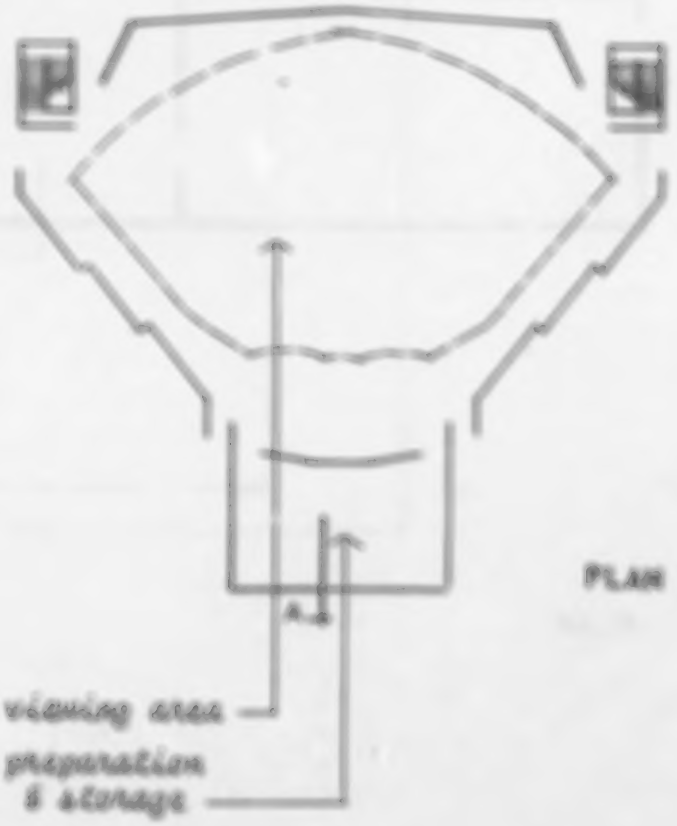
This study simply illustrates some of the basic planning needs in designing such very large group spaces. The two floor plans indicate the upper and lower levels of a room seating 200 students in the balcony and upwards of 300 more on the lower level. This particular method of arranging students, and the logic of using the balcony, are borne out when optimum viewing areas are considered and sight lines drawn (see Section A–A). The most effective seating in this kind of facility would be fixed units with folding tablet-arms arranged in continental fashion (if local codes allow) with a central aisle and two aisles. Finally, it is obvious that in a room of this size and complexity, the considerations of lighting, acoustics, and climatic conditioning are of utmost significance.

SECTION A-A





BALCONY PLAN



PLAN

FG FLEXIBLE – GROUP FACILITIES

Certainly no single word has been bantered about as much in educational circles as flexibility. Flexibility has been seen by some as the means for accommodating future changes in contemporary buildings, while others feel that it only represents a lack of real decision on the educator's part. Some understand it and what it can do, others accept it blindly for what it might do and never use it. The significance of flexibility was discussed in more detail in Part 2.

Flexibility in spaces designed to accommodate media creates special considerations and problems of which the designer must be aware; there is always a need for optimum viewing conditions, and the problems of sound isolation in "flexible" spaces cannot be overlooked. It is, however, recognized that in some educational programs the ability to regroup students quickly, without necessarily moving them to another space, has merit. This series of studies has been developed to illustrate how spaces accommodating media can be designed to permit intermittent regrouping of students as learning situations demand.

There are some essential requirements to be fulfilled before these flexible groupings will work:

1. Money must be invested in high-quality movable partitions which have sound reduction capabilities of 40 decibels or more, which do not impose heavy loads on the structural system, which provide closure on all four sides, and which are readily operable by the teacher. While cost once prohibited extensive use of these partitions, further developments are sure to occur in this area, and the ability to rearrange students may become so significant in the educational program that investment in the appropriate kinds of partitions will be eminently worthwhile even before cost has been greatly lowered.

2. Regrouping students changes image viewing requirements. Creating self-contained media modules (see study SG-1), some of which are portable and can be moved as the students move, may be the key to using image-display media in these facilities. In the following studies, it will be noticed that, as the groups are rearranged, some of the media modules are rearranged; some are set aside and used only for larger groups, and others are positioned for use with the smaller groups.

3. It must be as easy to regroup the furniture as it is to regroup the students. There is a need for lightweight, easily movable, and preferably modular, table and chair units which can be used in all kinds of grouping.

4. Carpeting as an acoustical element is important to flexible grouping and movable furniture. The educational benefits derived from permissive regrouping can be easily negated by the sound and confusion of scraping desks and chairs over hard-surface floors.

5. A final point is directed at the need for special lighting and climatic controls to allow these rooms to work appropriately. The necessary controls—often elaborate—will certainly be additional expense. Specifically, lighting must be provided on a variety of circuits so that when a large-group space is divided into medium- or small-group areas the lighting can be controlled separately in each of the smaller spaces. Likewise heating and cooling must be zoned so it can work effectively in smaller rooms created from larger ones and vice versa.

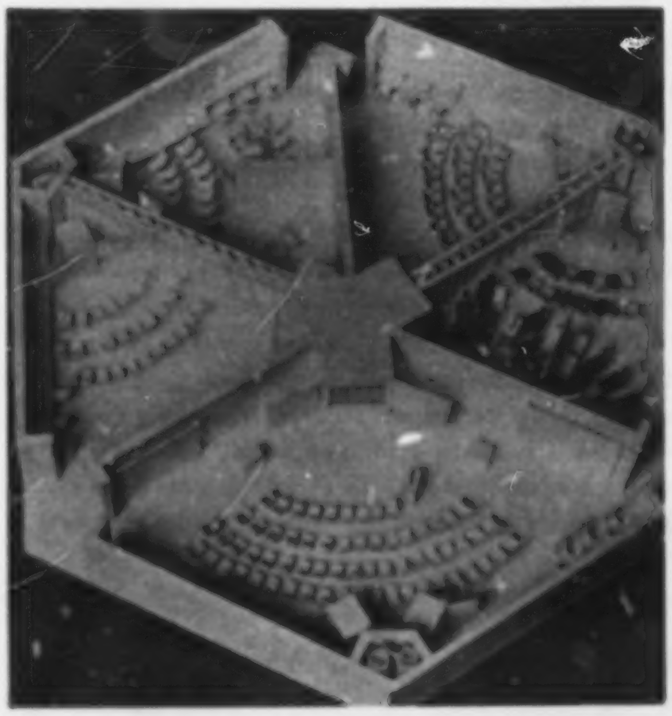
Most of the flexible grouping studies which follow are most appropriate for elementary and secondary schools. Although there are applications of flexible groupings in colleges and universities, the traditions of class scheduling will generally allow the provision of a mix of spaces to accommodate the variations in group size rather than a series of flexible facilities.

FLEXIBLE-GROUP STUDY FG-1

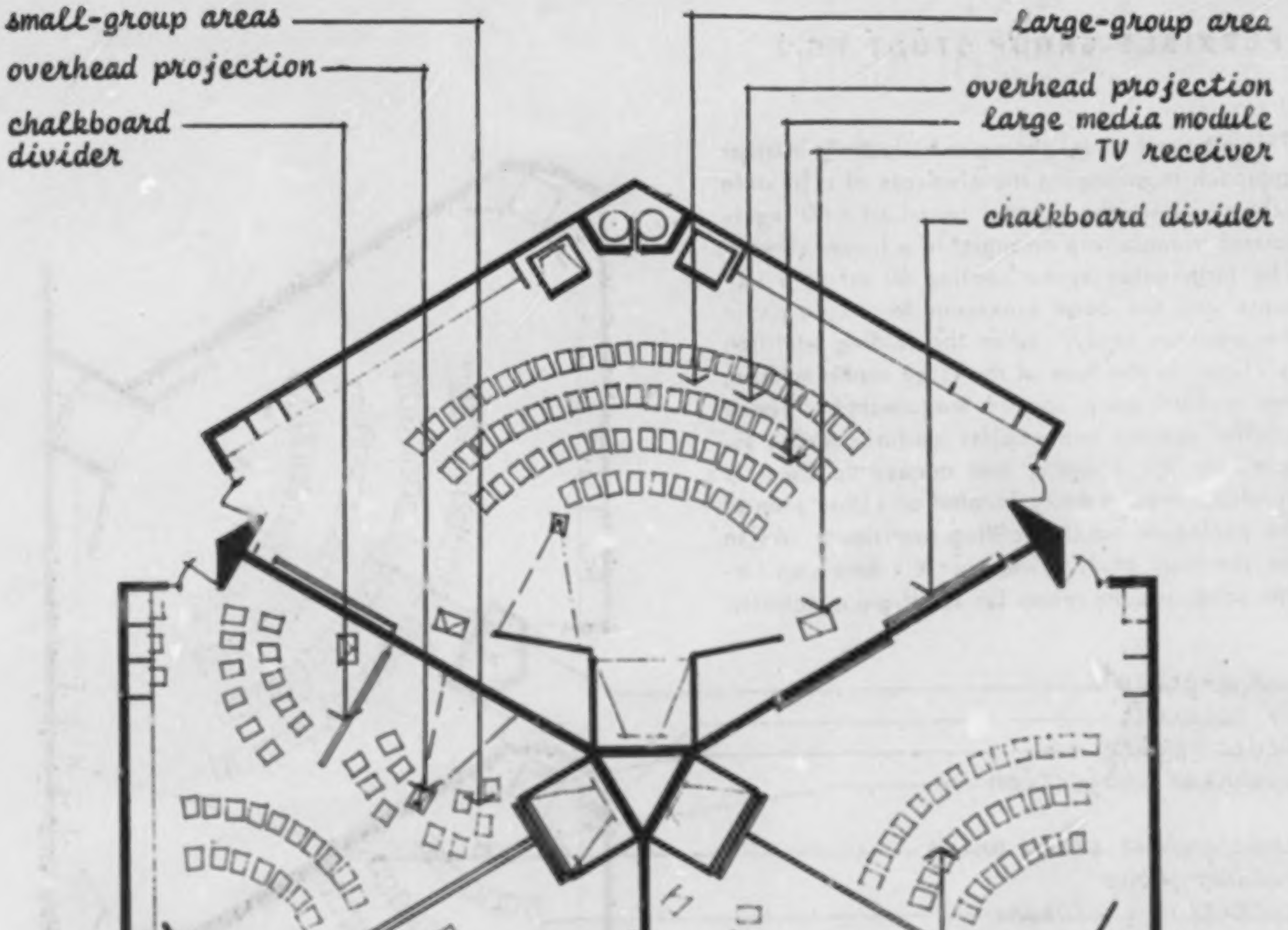
This hexagonally-shaped unit could well provide for the flexible groupings desirable as part of a loft-plan school or as a focus in a "school-within-a-school." It could be surrounded with complementary independent study, project, conference, teacher work areas and resource facilities.

Each third of the scheme is a large-group space seating 60 to 75 students; the shape of these rooms provides ideal viewing conditions for the media module, the supplementary front projection surfaces, chalk and tackboard areas. By closing the movable partition in any of these rooms, and by folding in the "wings" of the large media module, two medium-group spaces seating about 30 can be formed. At this point, the smaller media modules come into use for the medium-group.

Any one of the medium-group rooms can be rearranged to provide for three or four smaller groups oriented to TV monitors, overhead projection, or the media module. The key to this further subdivision is a series of two or three folding panels which form privacy barriers within the medium-group space and which can be used for supplementary display or projection surfaces.



Finally, each segment of the scheme provides some built-in counter and storage facilities and three or more independent study carrels. These carrels may or may not be wired into a central resource area for audio and visual call-up of materials; they may be used for general independent study or may be allotted temporarily to students doing project work.

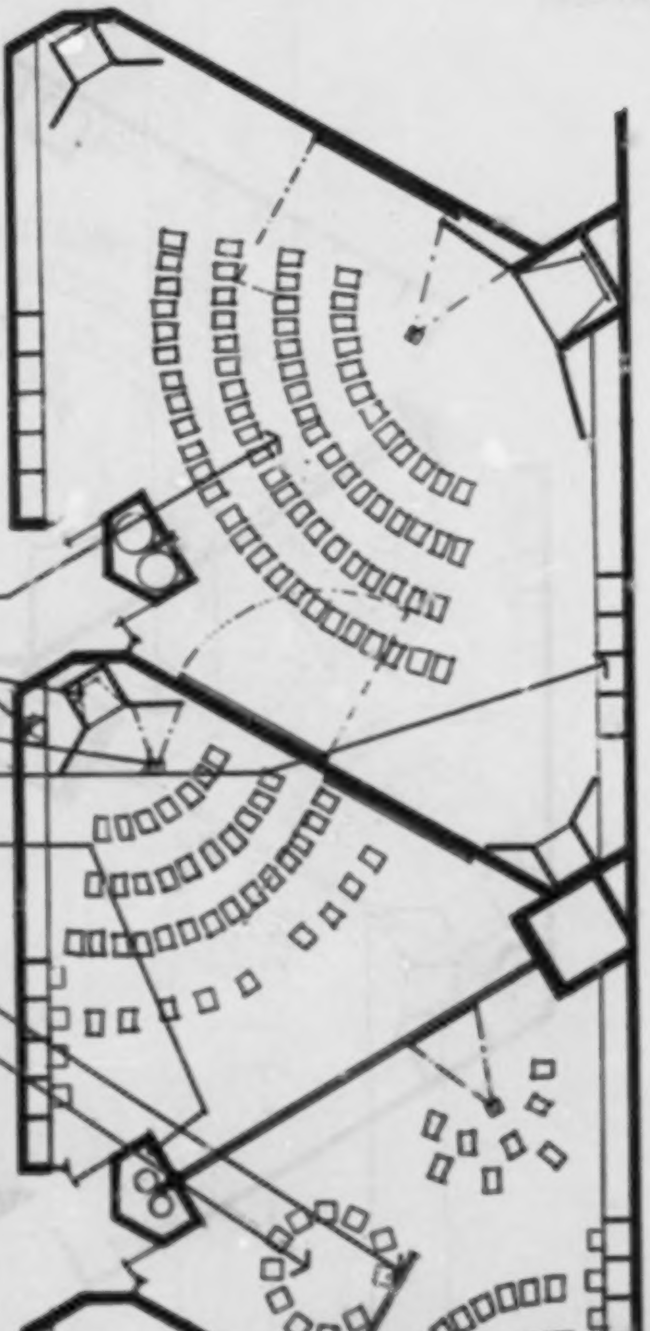

small-group areas
overhead projection
chalkboard divider
large-group area
overhead projection
large media module
TV receiver
chalkboard divider
small media modules
40 db partition
medium-group area
independent study units
medium-group area
small groups
independent study units

PLAN

scale: 1/16" = 1'-0"

FLEXIBLE-GROUP STUDY FG-2

This plan and model photograph illustrate another approach to arranging the elements of a flexible scheme. Here the spaces, based on a 60° equilateral triangle, are arranged in a linear scheme. The large-group space seating 60 or more students has the same provision for media as in the previous study; when the folding partition is closed to the face of the large media module, two medium-group spaces are created. These smaller spaces use smaller media modules located in the corners, and access to them is provided through doors located on either side of the enclosure for the folding partitions. As in the previous study, swing-out dividers can further subdivide the rooms for small-group activity.

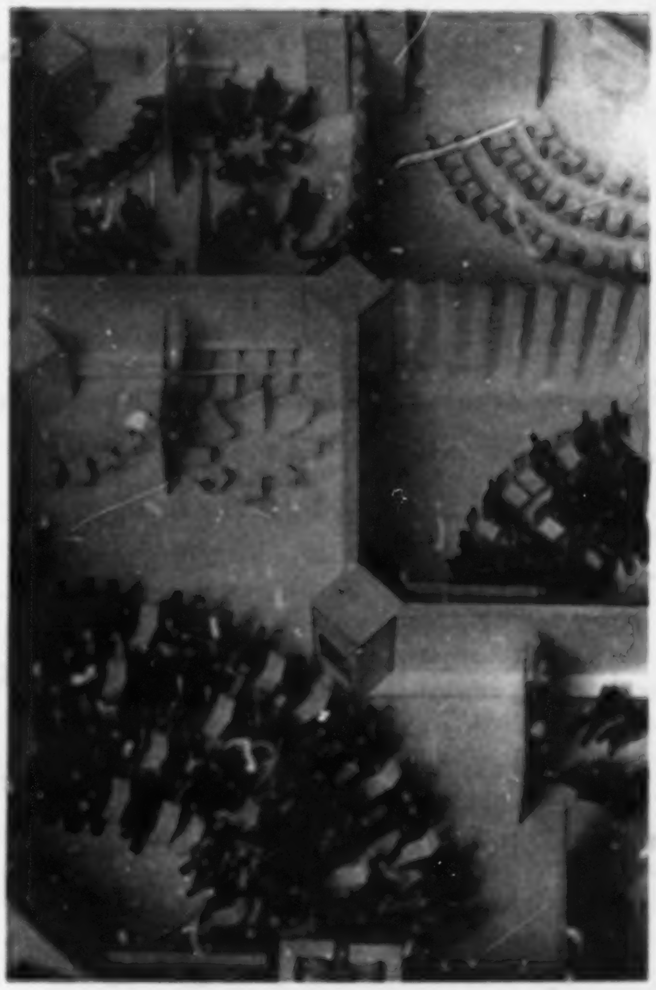

large-group
TV receiver
media module
overhead projection
independent study units
medium-group
partition enclosure
chalkboard dividers
small groups

PLAN
scale: 1/16" = 1'-0"

By referring to the comments and drawings at the beginning of the next series of studies – Renovated Classrooms – it can be seen that this scheme particularly lends itself to remodeling existing facilities. The linear flexible-group rooms are 48 to 50 feet wide and can be incorporated in an existing classroom wing by moving the corridor to the outside.

Within the viewing areas provided by this scheme, as well as in the others, the seating may be arranged to encourage interaction and discussion through semi-circular and horseshoe-shaped forms or it may be lined up for more direct interaction between students and media-instructor.

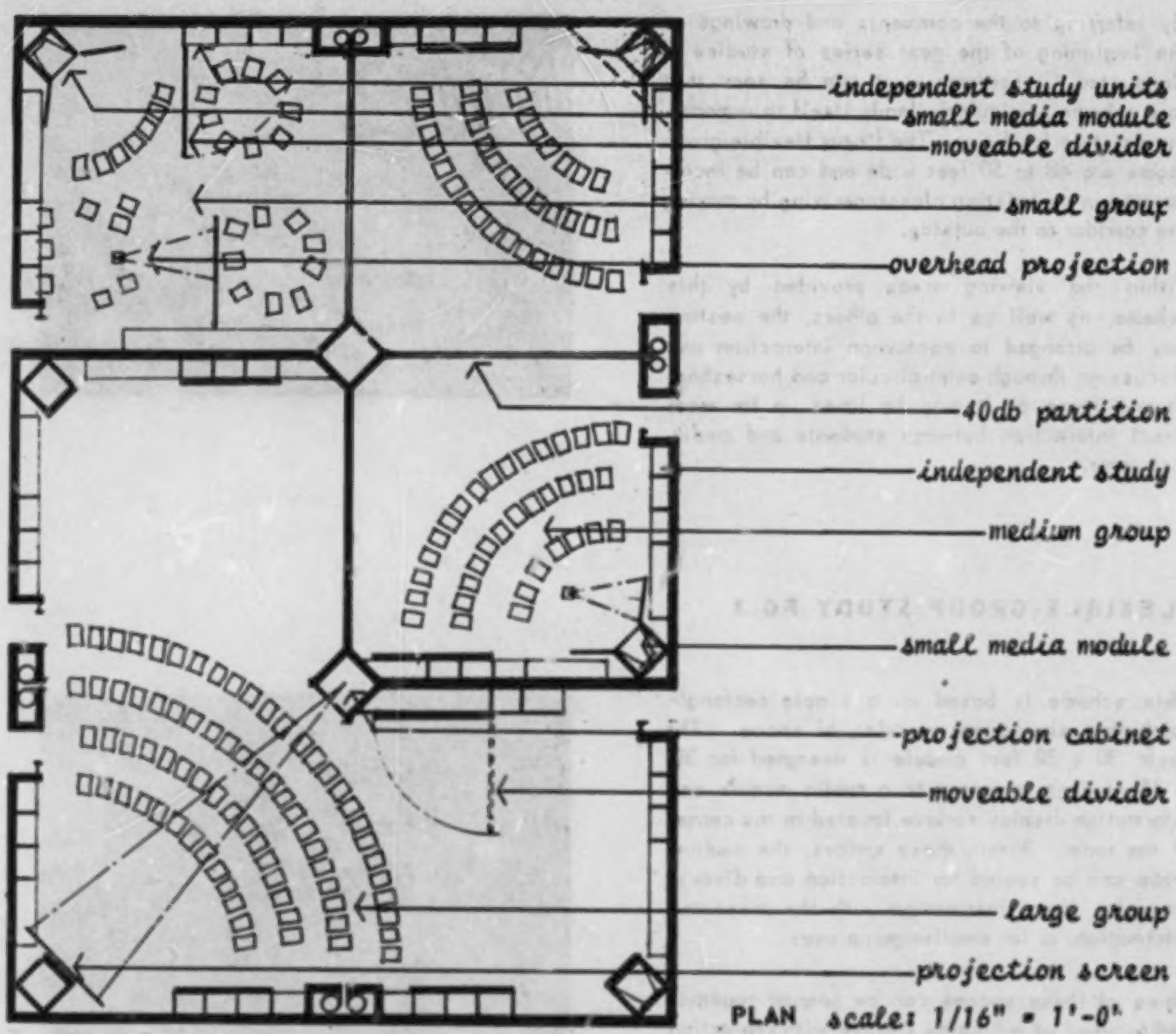
FLEXIBLE-GROUP STUDY FG-3



This scheme is based on a simple rectangle combining six square modules of space. The basic 30 x 30 foot module is designed for 30-to-35 students oriented to a media module and information display surface located in the corner of the room. Within these spaces, the medium group can be seated for interaction and discussion, for direct interaction with the presented information, or for smaller-group uses.

Three of these spaces can be opened together and focused on a display surface with projection originating from a self-contained projection cabinet located in the rear of the room; this becomes a front-projection solution. The audio systems would be designed to serve each of the basic modules independently or to be thrown together as a single system when the three rooms are opened up as one. The projection equipment for the large-group spaces is housed in a series of self-contained acoustically-treated boxes which are wheeled about and plugged in as necessary.

It can be seen from the drawings and the comments above that this entire scheme is based on movable and interchangeable equipment and display surfaces.


independent study units
small media module
moveable divider
small group
overhead projection
40db partition
independent study
medium group
small media module
projection cabinet
moveable divider
large group
projection screen
PLAN scale: 1/16" = 1'-0"

FLEXIBLE-GROUP STUDY FG-4

In many schools and colleges the problem of economically utilizing large-group facilities, regardless of educational justification, is a very real one. For this reason, a number of attempts have been made to build a divisible large-group teaching space; the combination of smaller spaces with high utilization and the large-group room create a total unit which is more economically feasible. In general, however, there have not been many attempts to design divisible facilities which include media as an integral part of the instructional system. This study is developed to provide a large-group divisible space in which media can be used significantly.

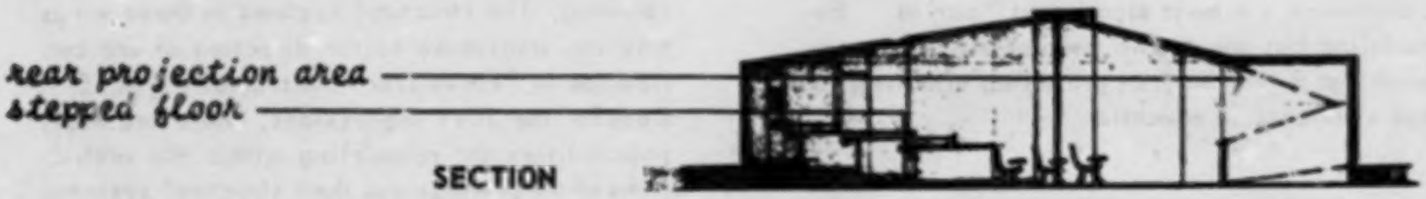
The flat floor in the front of the room will seat approximately thirty students in loose chairs which can be rearranged for small-group, conference, or recitation presentations. The rear sections of the room are located on stepped floors, and seating may be on risers with continuous tables, loose chairs and continuous tables, or floor-mounted tablet-arm chairs. The

dividing wall between these rear sections is a permanent one providing necessary acoustical privacy when the rooms are used independently. The folding partitions shown extend halfway across the auditorium and complete the division into three medium-group rooms.

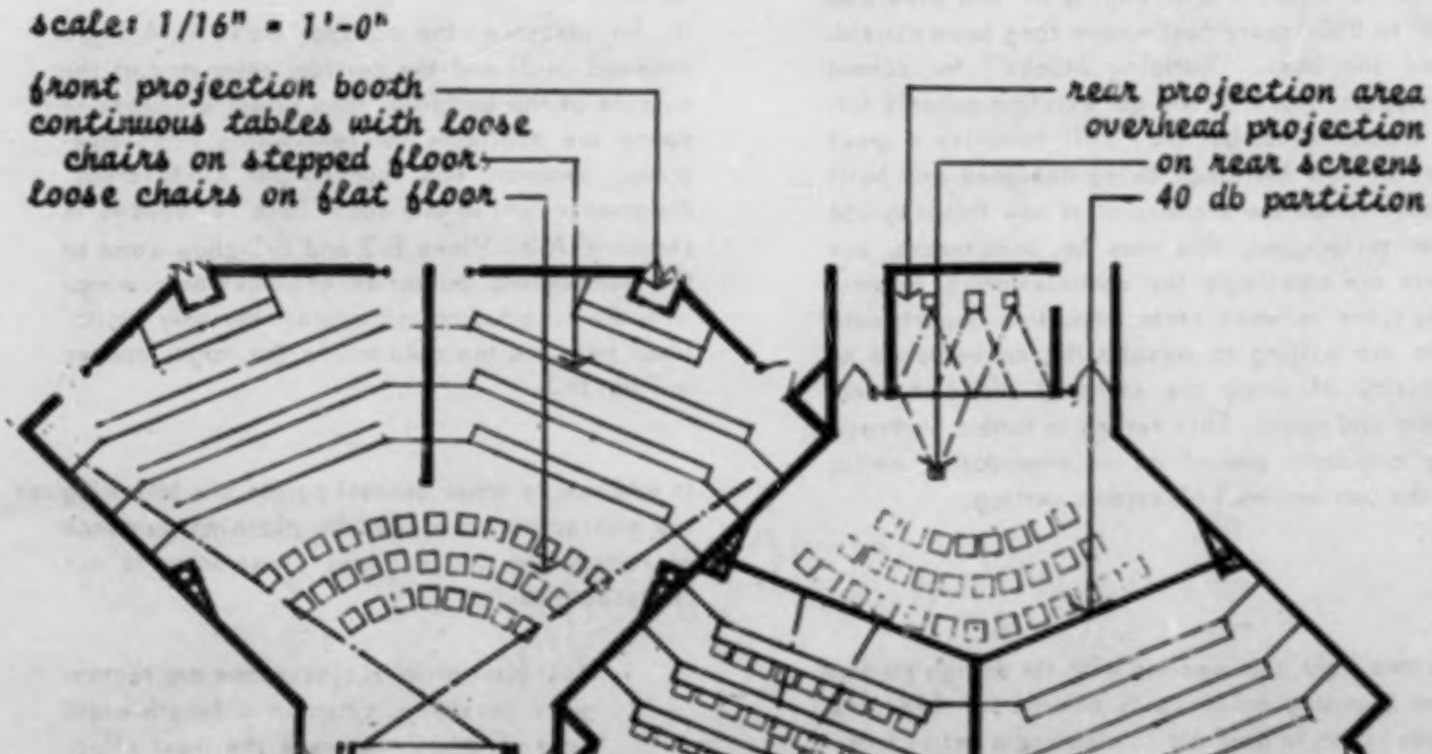
Media are introduced into the rear sections through front projection of multiple images on a display surface located on the movable partition; the projection equipment would be housed in a projection center in the back of the room and would be remotely-controlled by the instructor.

When the entire space is used as a large-group facility, the large projected images are produced by a rear projection system. As can be seen in the diagram, two simultaneous rear-projected images can be produced if necessary.

The plan also indicates the manner in which these divisible units can be strung in a chain if several of them were desirable for a larger institution. The combination of flat and stepped floors, together with front and rear projection centers, render this divisible auditorium quite appropriate for instruction with media.


rear projection area
stepped floor

SECTION


scale: 1/16" = 1'-0"
front projection booth
continuous tables with loose chairs on stepped floor
loose chairs on flat floor
rear projection area
overhead projection on rear screens
40 db partition

PLAN

RC RENOVATED CLASSROOM FACILITIES

Probably the most effective way to introduce media into our educational system is through the renovation of existing classrooms. With over 120,000 schools and institutions throughout this country, there must be well over 2,000,000 such classrooms – a most significant "market." Remodeling but one or two percent of these rooms would go a long way im promoting effectiveness and efficiency in education.

These conventional classrooms–usually seating 25 to 35 students and ranging in floor area from 750 to 850 square feet – have long been considered the basic "building blocks" for school buildings. Not only are our existing schools full of these rooms, but they still comprise a great part of new buildings being designed and built today. From the standpoint of new thinking and new techniques, this may be unfortunate, but there are amazingly few administrators, boards, taxpayers or even state education departments who are willing to forsake the convenience or security of using the standard old classroom again and again. This serves to further increase the emphasis placed on accommodating media in the conventional classroom setting.

In this light, this section with its design studies and planning guidance is offered for three reasons: first, to give aid in creating a better learning environment in existing classrooms; secondly, to show ways of accomplishing this renovation; and thirdly, to suggest that remodeling can become a most potent force for introducing change in our schools and colleges.

By far the greatest percentage of existing classrooms in our schools are located in "egg-crate" fashion, flanking a corridor or circulation artery. This creates wings of classrooms 56 to 60 feet wide (two 24-foot classrooms plus an 8-foot corridor). The structural systems in these wings may run transverse to the direction of the corridor (as in Plan A-1) or longitudinally (Plan B-1). Despite the first impressions, there are many possibilities for remodeling within the restrictions of these wings and their structural systems.

If, for instance, the corridor walls in A 1 are removed (A-2) and the corridor relocated at the outside of the building, then larger elements of space are available for remodeling into large-group, seminar, and independent study areas. An arrangement of one such "mix" of spaces is shown in A-3. Plans B-2 and B-3 show some of the remodeling potential of classroom wings with the longitudinal structure; the only limitations here are the columns in the larger spaces in Plan B-3.

In addition to these general points, the following are are offered as more specific planning guidance in remodeling conventional classrooms to accommodate media,

1. Most conventional classrooms are rectangular in shape, often in a length-width ratio of 3-to-2, whereas the most effective shape for a media-oriented room is a square (see study MG-1). Therefore, one of the guiding principles is to select for renovation classrooms that are most nearly square in shape, and to design

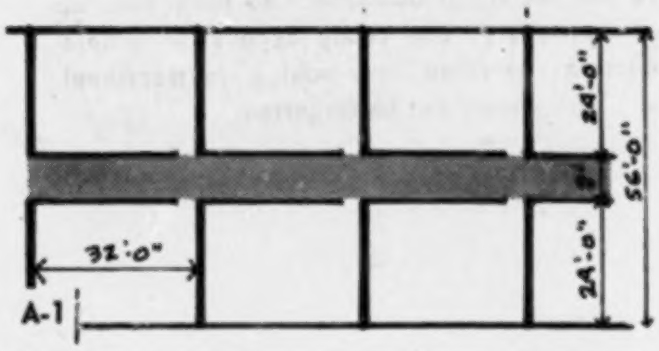
classrooms with active teaching areas that are more square than rectangular.

2. Introducing media into the existing classroom may involve the development of some cabinet work to contain equipment and display surfaces. These "media modules" (described in study SG-1) may be built-in, semi-fixed, or completely portable, and may involve front or rear-projected images or both. Many variations on this media module are presented throughout the design studies.

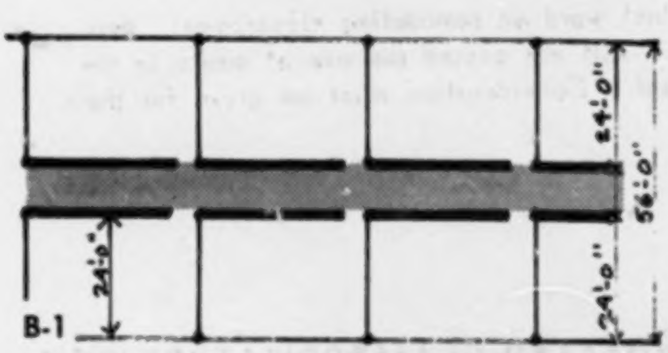
3. Much of the renovation work in the school, including the building of the media modules, can be accomplished by carpenters, electricians and painters who are already part of the permanent staff of most schools and institutions. Rarely will elaborate and expensive contracting be necessary to make the changes.

4. Since nearly all classrooms are provided with some means of natural light, drapes, blinds, shutters or other devices will be required when media are used in the room. If media are rear-projected, the necessity for this control of natural light is much less critical that it is if they are front-projected. The exception to this rule is the use of overhead projection which, although it involves front-projected images, can be utilized in rooms with natural light.

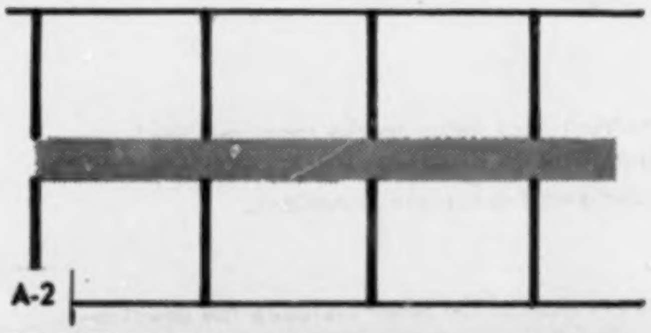
5. Once devices are found for controlling natural light, then some means of allowing ventilation must be devised if the windows are the sole source of fresh air. The renovation of this type of classroom provides an ideal opportunity for introducing air conditioning or other new air-handling systems in the school.



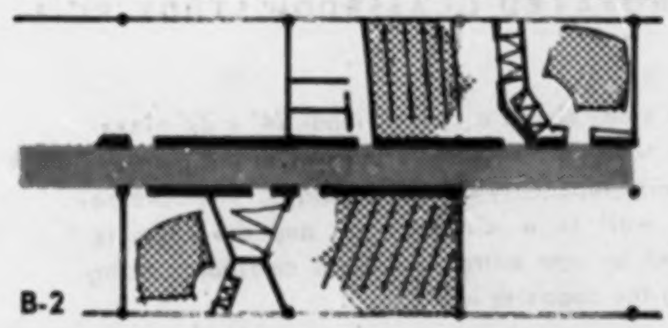
A-1



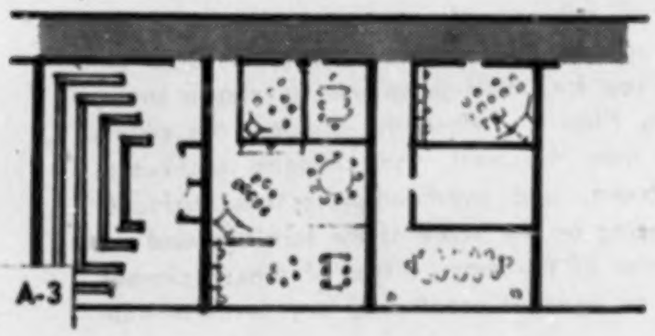
B-1



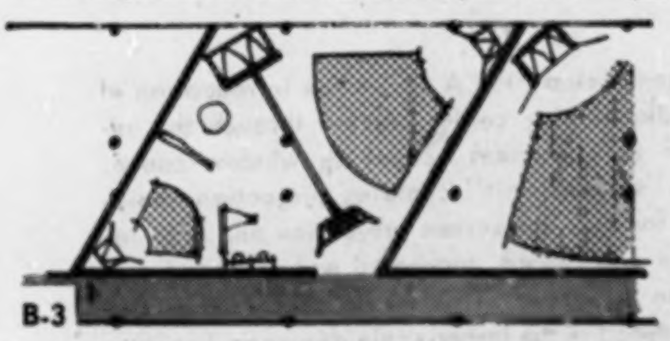
A-2



B-2



A-3



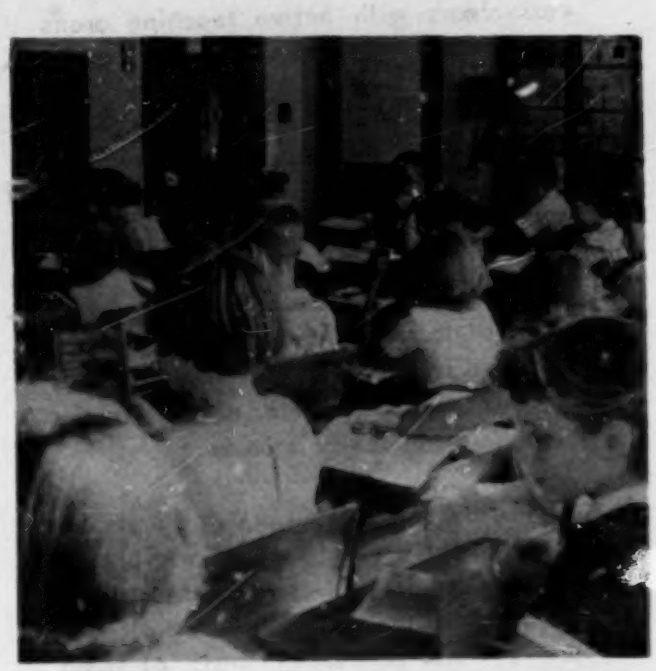
B-3

6. Generally, existing lighting systems will have to be rewired and recircuited during the renovation. This will allow for several levels of illumination in the room; these various levels are needed to compensate for variations in brightness among the media that will be used.

7. Flexible seating is necessary in a remodeled classroom. Seating needs to be arranged so that it can be focused on the various display surfaces, and the row-on-row, straight seating found in most conventional classrooms does not provide the best viewing area for media.

8. Remodeling classrooms should not be proportionately expensive. It does not usually require a complete gutting of the room. It does, however, require sensitive, creative architectural services in planning and design.

A final word on remodeling classrooms: they alone will not assure the use of media in the school. Consideration must be given for the teachers using these spaces; they need equipment in good working order, a supply of necessary parts and technical assistance to back them up when necessary, and ready access to simple production services for making instructional aids. This should not be forgotten.

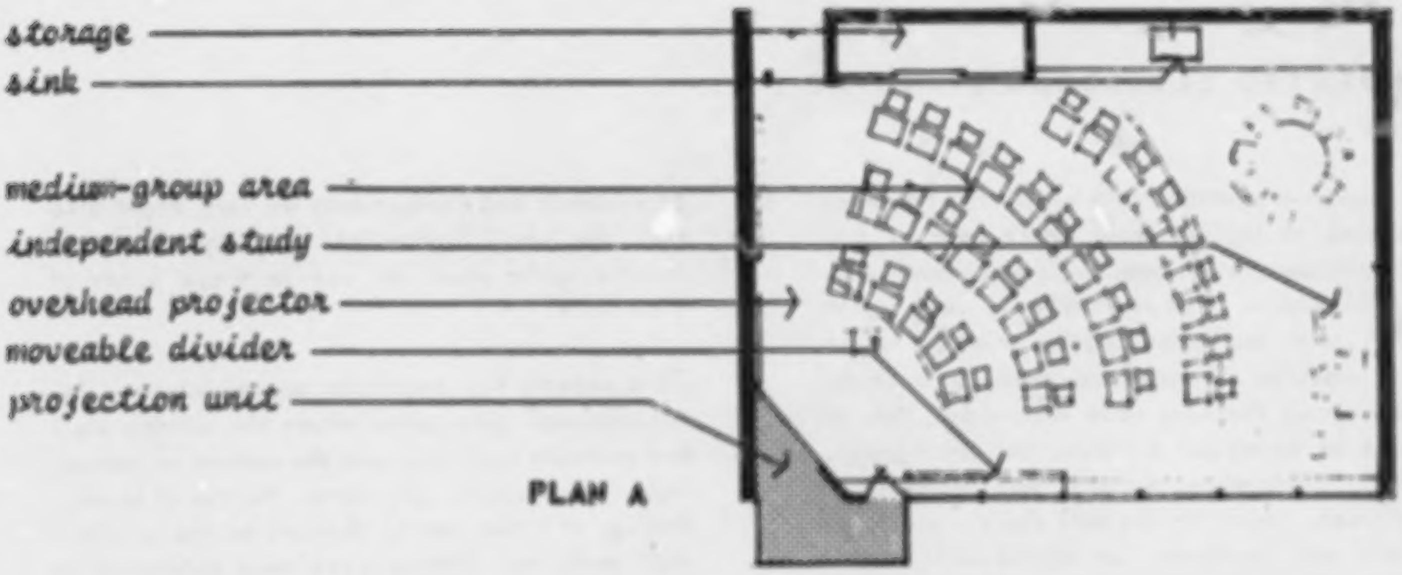


RENOVATED CLASSROOM STUDY RC-1

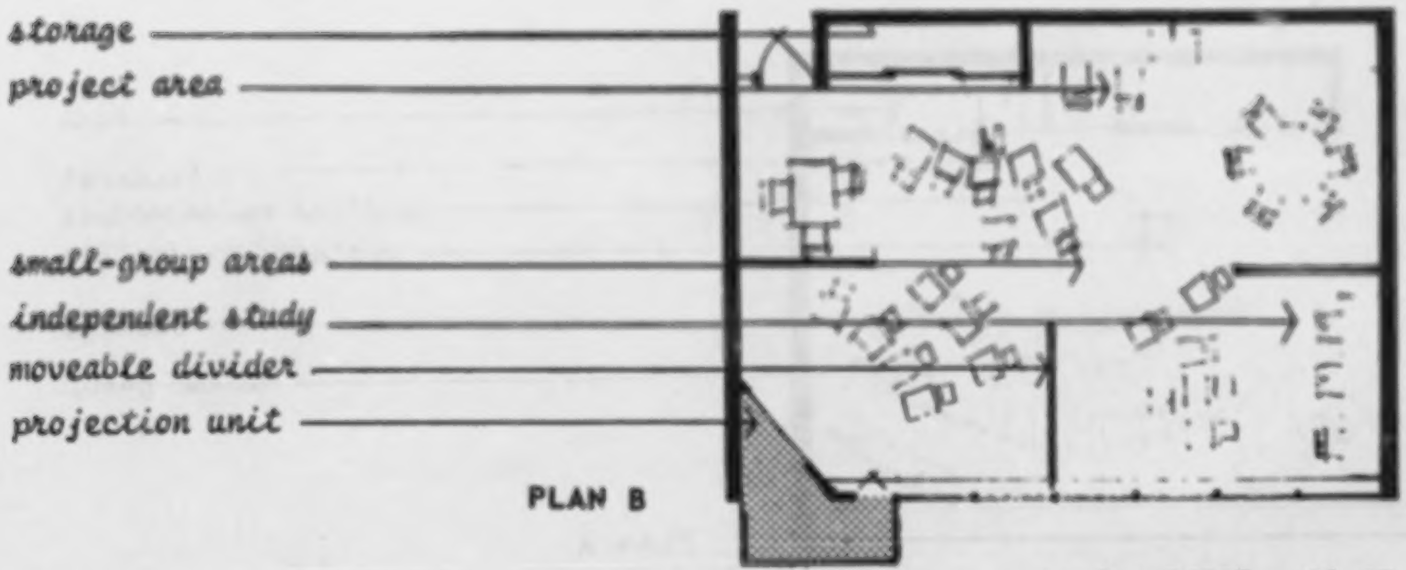
This study shows a conventional 24' x 32' classroom such as those found in many of our elementary and secondary school buildings. The outside long wall is a window-wall, and the room is served by one entrance from a corridor running along the opposite wall.

The remodeled Plan A shows the introduction of a media display center created through the addition of a cabinet occupying window space. This "window unit" contains projection equipment for the rear-screen projection and also includes chalkboard, tackboard and overhead projection surfaces. This media center, shown in more detail in the larger-scale drawings, becomes the instructional focus for the room, and the loose tablet-arm chairs are oriented toward it for medium and small-group presentations.

The renovation of the room includes the development of cabinetwork on the inside wall and swinging panels to permit the room to be reorganized for small-group use as shown in alternate Plan B. When the dividers are swung away from the wall, they become tackboard, chalkboard, and overhead-projection surfaces. Depending on the scale of the furniture and the character of the room, either of these schemes could be used at practically any level of education.

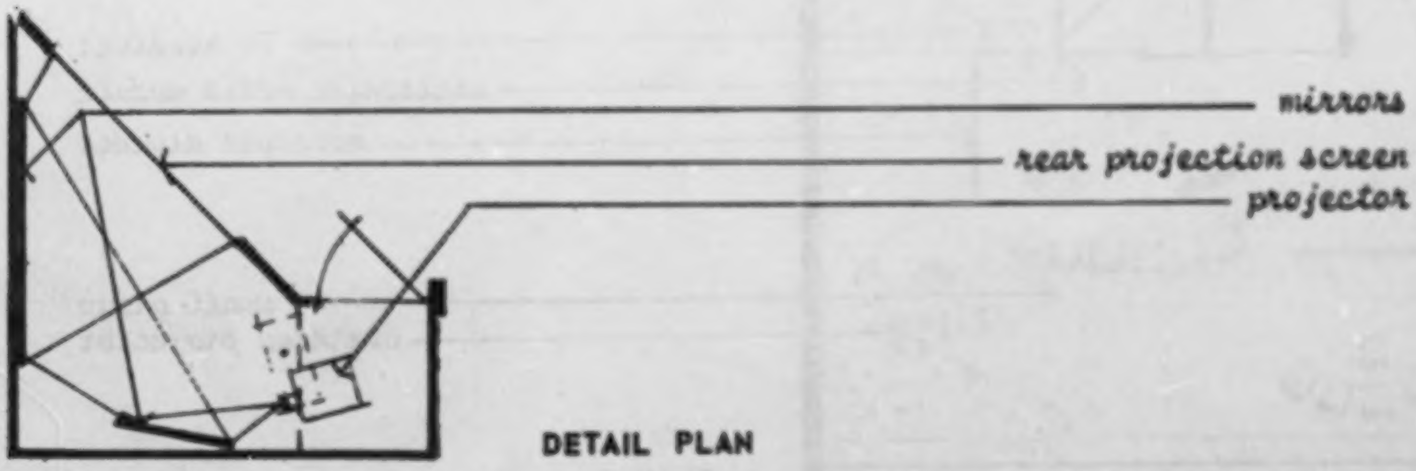

storage
sink
medium-group area
independent study
overhead projector
moveable divider
projection unit

PLAN A


storage
project area
small-group areas
independent study
moveable divider
projection unit

PLAN B

scale: 3/32" = 1'-0"

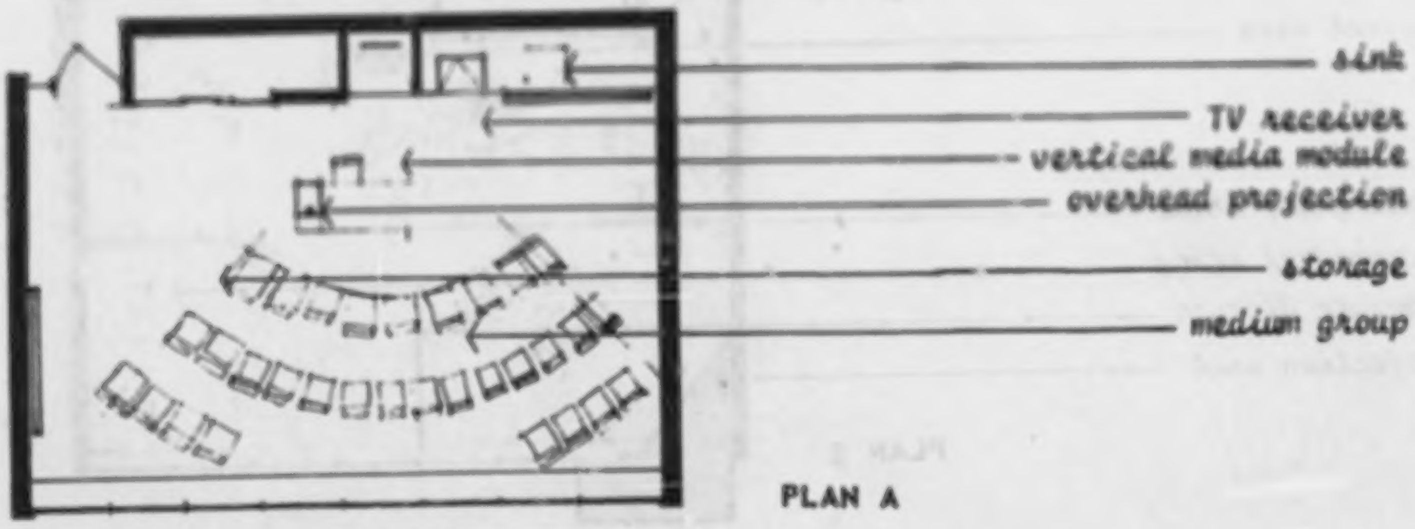

mirrors
rear projection screen
projector

DETAIL PLAN

RENOVATED CLASSROOM STUDY RC-2

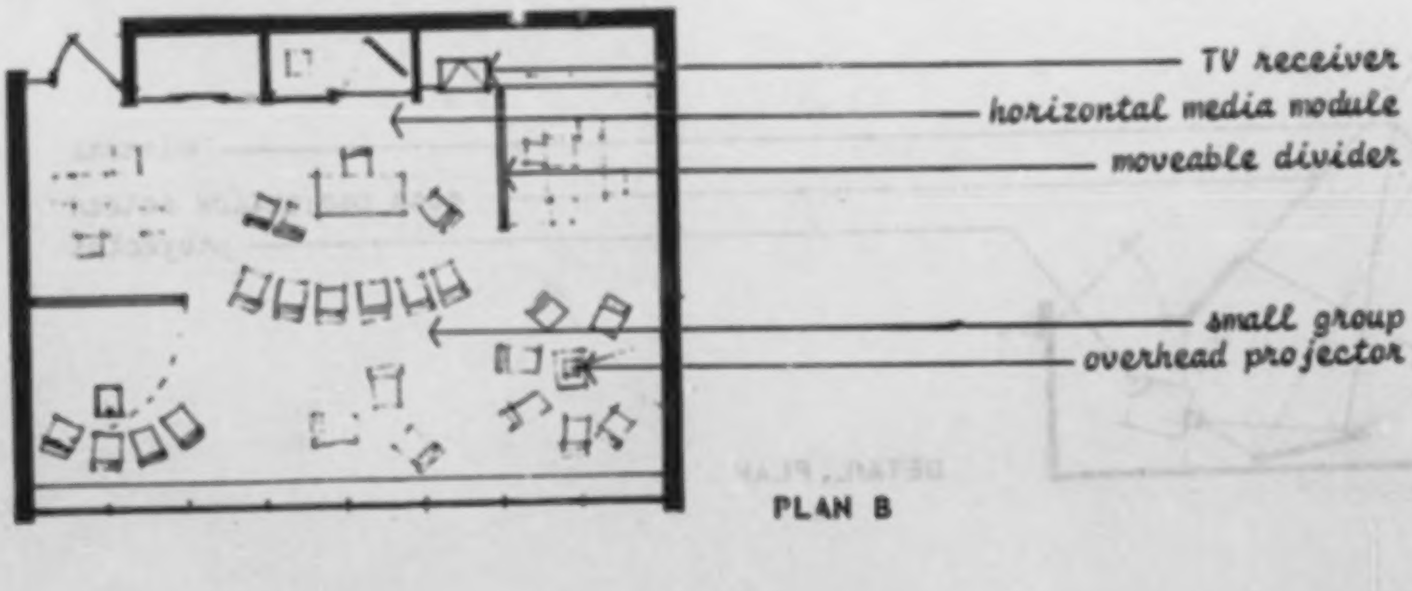
The interior longwall of this classroom has been remodeled to include coat space, one or two media modules, television, audio equipment, sink and work space. The room may be used, as in Plan A, with the loose seating oriented to the media modules for medium-group instruction. Plan B shows the same room subdivided, through the use of swing-out dividers, for small-group, seminar, conference, project, and independent study uses. Here the dividers double as visual barriers and surfaces for chalkboards, tackboards, and projection surfaces. Small groups of students and independent workers might also find the small lightweight cartridge film projectors quite ideal for use in these kinds of situations.

This scheme has particular appropriateness for conventional classrooms where the window-wall has northern exposure, and the control of natural light is not critical. Of course, the use of blinds, drapes, or other control devices on the window-wall make the scheme even more extensive in its application.


sink
TV receiver
vertical media module
overhead projection
storage
medium group

PLAN A

scale: 3/32" = 1'-0"


TV receiver
horizontal media module
moveable divider
small group
overhead projector

PLAN B

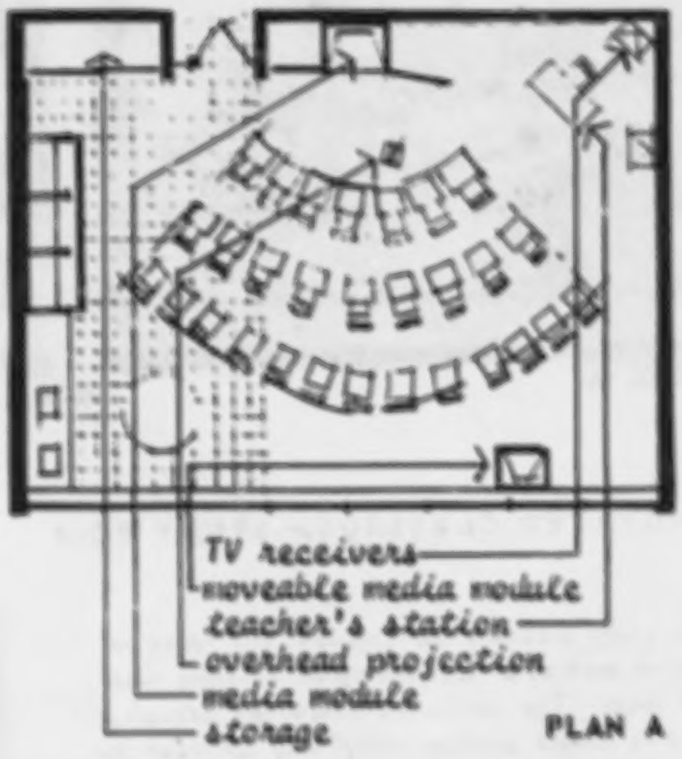
RENOVATED CLASSROOM STUDY RC-3

At the elementary level there are distinct advantages in the self-contained classroom, as long as within that space variations in grouping and activities are permitted. This study takes a typical elementary classroom and remodels it to provide these variations.

Plan A and the photograph of its model show the room as it would be set up for medium-group use with all students focusing on the teacher and the various display surfaces. The furniture consists of lightweight individual tables and chairs, and are oriented toward a media module consisting of a rear projection element and a screen for the overhead projector.

Plan B and the photograph of its model indicate how the same room can be subdivided for a number of functions including small groups working with films, slides and television, small groups working with the teacher, small groups working in "dirty areas" and on projects, and individuals working alone at study carrels. Throughout the school day, the students in a room of this type would move from group to group and functional area to functional area as abilities and progress demand; occasionally there would be teacher and media presentations for all to see.

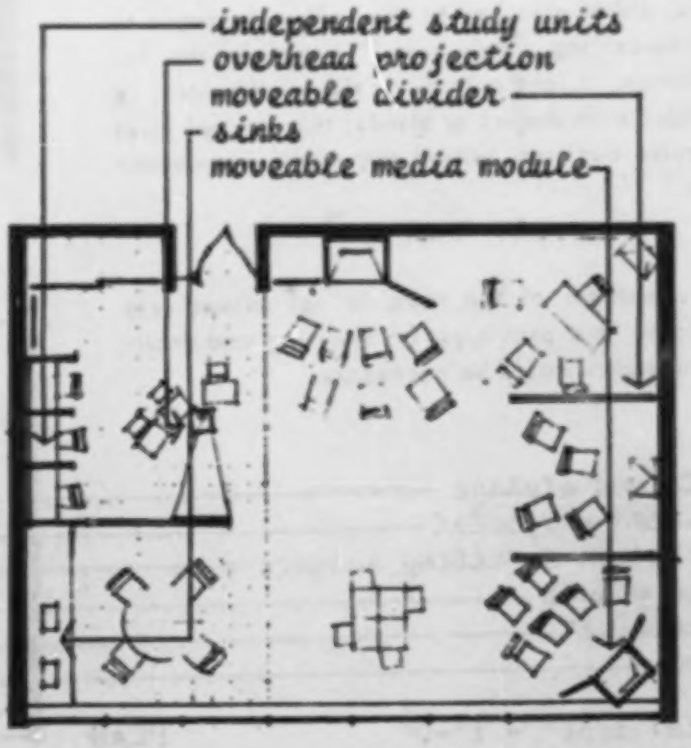
This classroom could serve as the basic functional unit in a nongraded program as long as the program recognized the self-contained classroom in this role. It is also designed for multi-age teaching, where there might be several groups in the room consisting of students at different ages but similar ability levels.

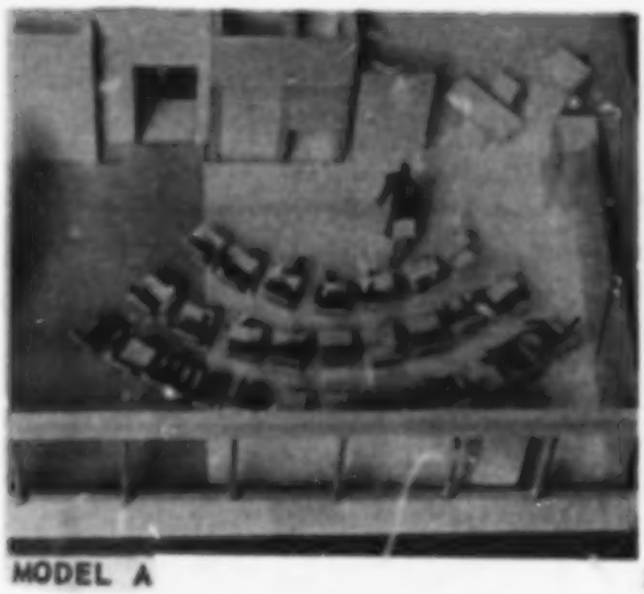

TV receivers
moveable media module
teacher's station
overhead projection
media module
storage

PLAN A

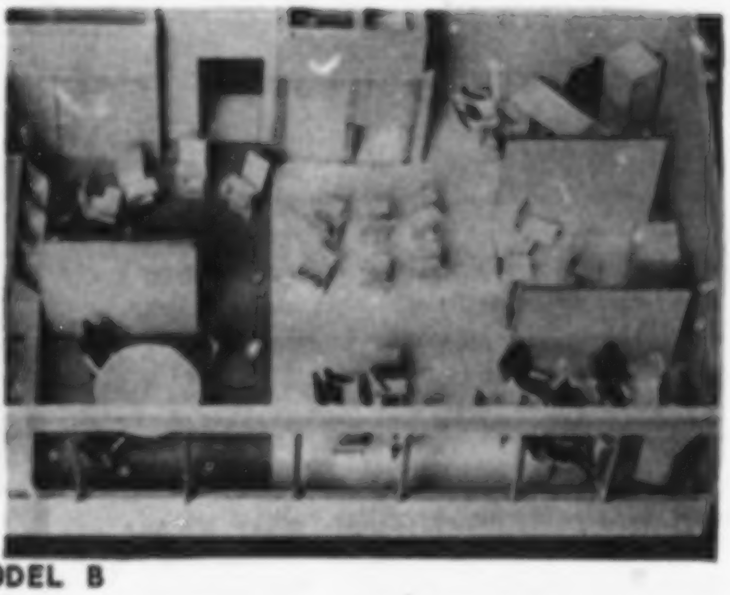
scale: 3/32" = 1'-0"

PLAN B


independent study units
overhead projection
moveable divider
sinks
moveable media module



MODEL A

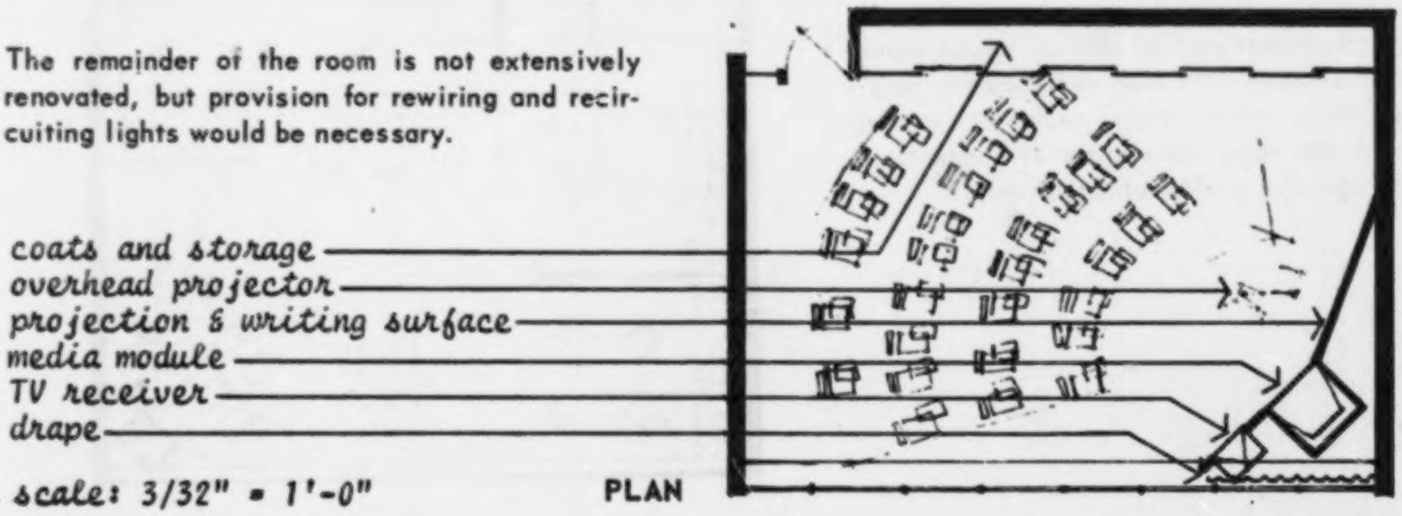


MODEL B

RENOVATED CLASSROOM STUDY RC-4

This study presents the simplest and least expensive method of remodeling an existing standard room. The media are introduced through a portable media module which may be used for 8mm, 16mm, or slide projection, and which contains a screen surface for overhead projector use. In addition, a mobile cabinet would contain a TV receiver and audio recording and playback equipment. Simple writing and projection surfaces, either attached to the wall or fastened to floor-to-ceiling "pole-cats," complete the installation. Light control on the window-wall is provided with drapes or blinds; this control must be quite positive behind the media to prevent glare.

The remainder of the room is not extensively renovated, but provision for rewiring and recircuiting lights would be necessary.


coats and storage
overhead projector
projection & writing surface
media module
TV receiver
drape

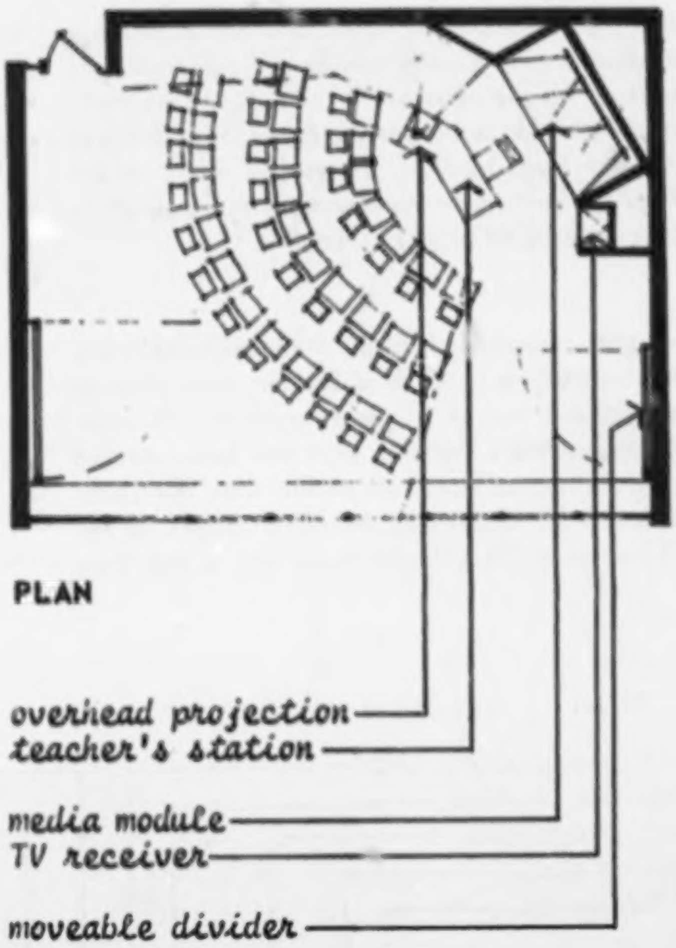
scale: 3/32" = 1'-0"

PLAN

RENOVATED CLASSROOM STUDY RC-5

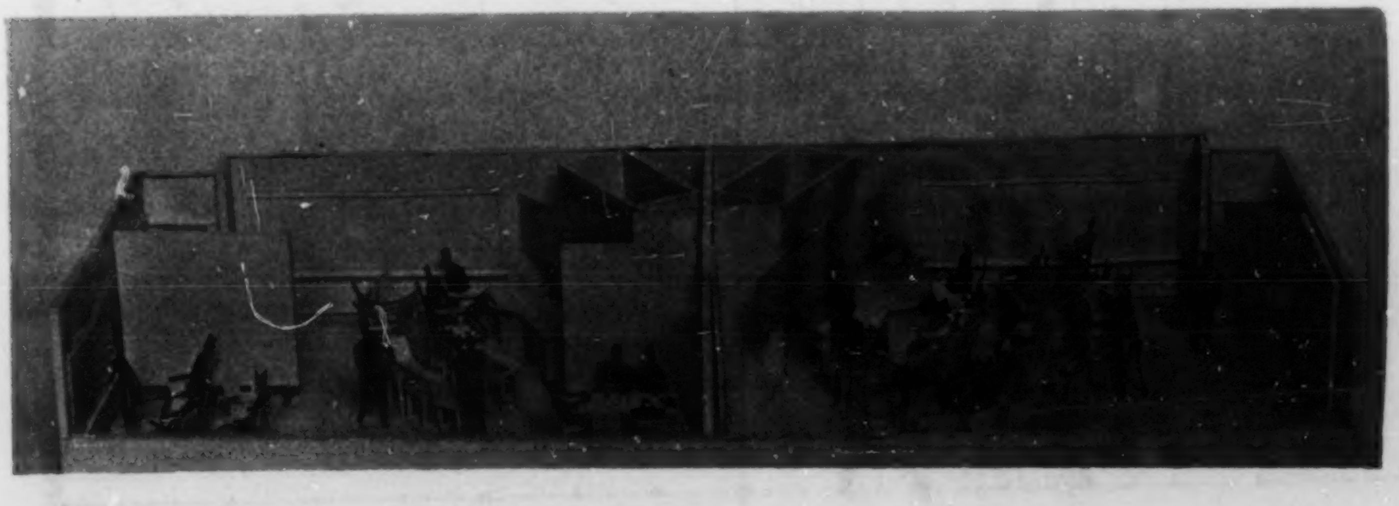
Generally, conventional classrooms are arranged end-to-end along a central corridor. In remodeling such classrooms, some consideration should be given to the advantages gained from remodeling two of them at once, allowing more freedom in design and variation in spaces and functions.

This study indicates a basic classroom which may be placed end-to-end with other such rooms. Although some construction is necessary, this remains a simple and straightforward solution for introducing media in a series of rooms. The photo shows two rooms each set up for different functions. Two points are important. First, we see that by rearrangement of seating to focus on the display and TV surfaces, extra space is available in the room without compromising either comfort or capacity. Secondly, the use of the media center and other display surfaces permit, even in a simple classroom, a wide variation in media and groupings. In this study television can be used simultaneously with slides, movies, and the overhead projector; or any combination of these may be utilized if the program demands it. As in previous studies, the rooms may be rearranged for smaller-group activities. Finally, the rooms may act as a unit, allowing students to move from medium groups to small groups between the two rooms.



PLAN

scale: 3/32" = 1'-0"

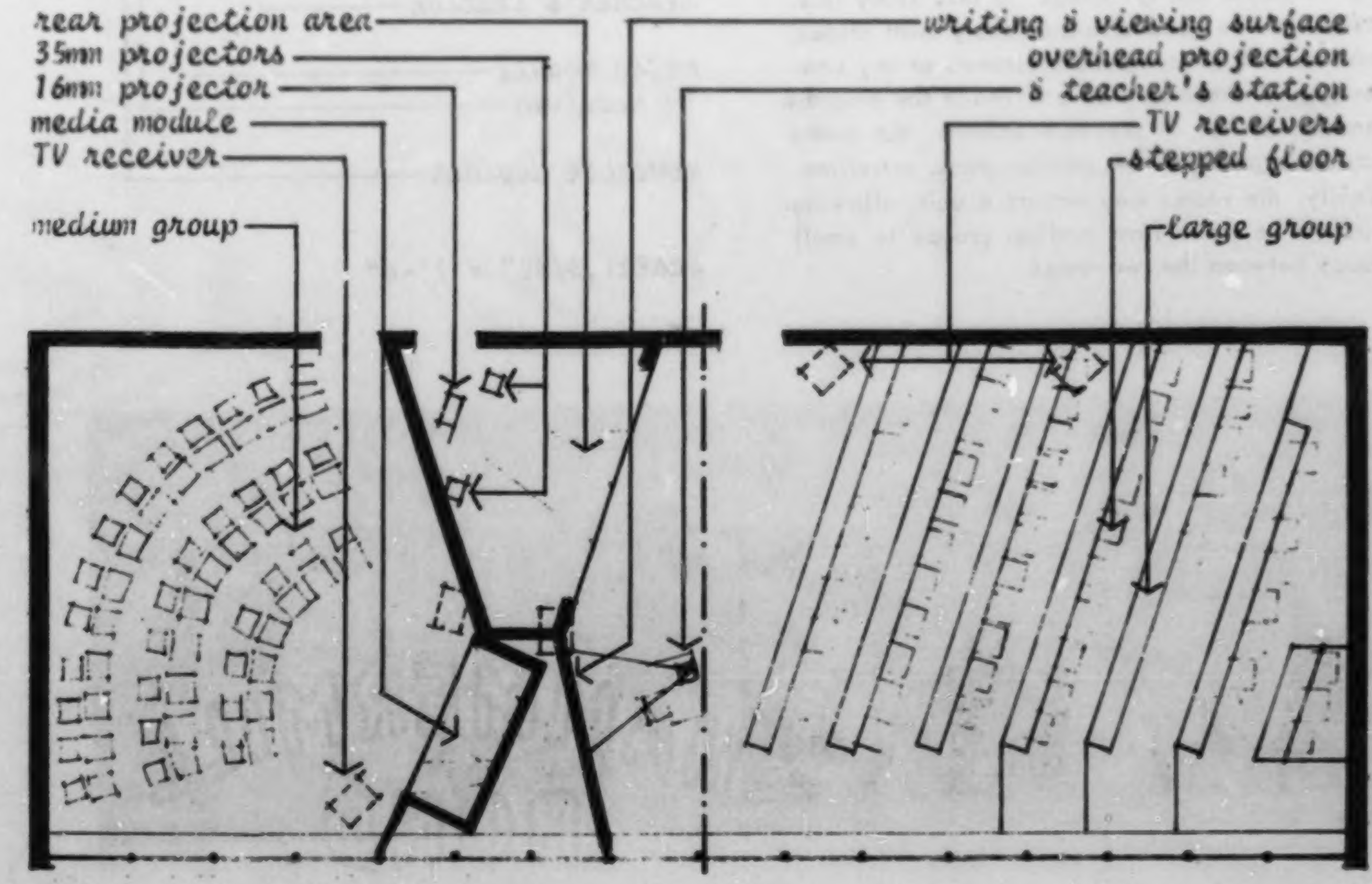


RENOVATED CLASSROOM STUDY RC-6

Once two classrooms are considered together for renovation, a wide variety of opportunities opens up for the planner. This study, particularly appropriate for secondary schools and colleges utilizing large groups, reassigns extra space saved by seating rearrangements to large-group rooms seating 65 or more students.

The plan shows a third of a conventional two-room unit being used as a 30-seat room through the introduction of a media module and other display surfaces. Next to this has been created a rear-projection area, accesible from the corridor, used for displaying multiple images to the 65-seat room. This larger room has a flat floor to accommodate the first three rows of seats, and then a four-step platform to provide adequate viewing from the rear of the room. The seating is diagonally oriented to focus on the major display surfaces, but yet to provide appropriate viewing of an overhead projected image and ckalk or tackboard surfaces. Riser-mounted seats would be used on the stepped platform, while the first three rows might utilize loose chairs and counters. This loose furniture, through rearrangement, might allow the front of the room to function as seminar, conference, moot court, or case study space, introducing a new dimension in flexibility. In addition to the two rooms, there is a storage space for equipment and supplies.

PLAN *scale: 1/8" = 1'-0"*


rear projection area
35mm projectors
16mm projector
media module
TV receiver
medium group
writing & viewing surface
overhead projection
& teacher's station
TV receivers
stepped floor
large group

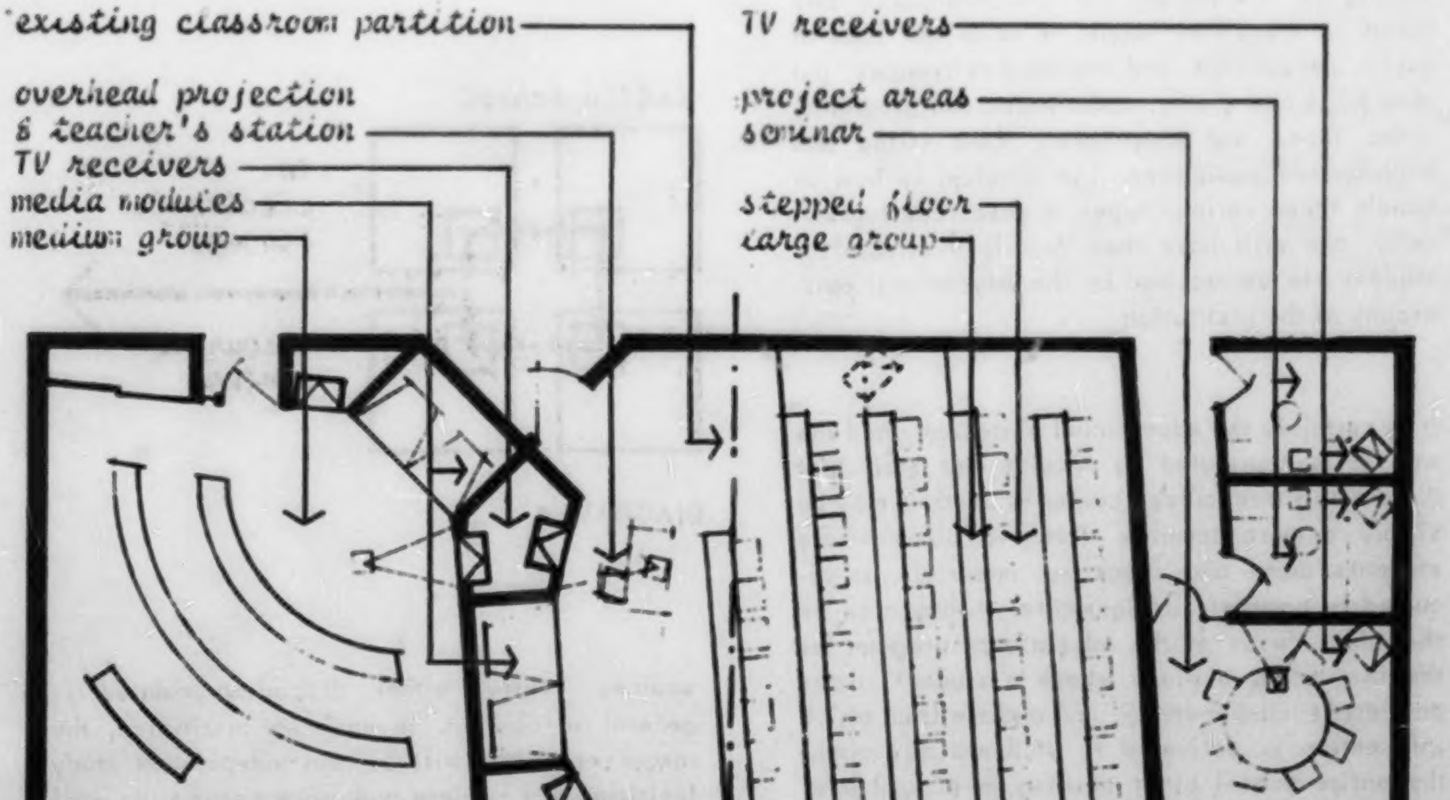
RENOVATED CLASSROOM STUDY RC-7

Taking two classrooms together allows still greater refinements in facilities planning; they can be remodeled to provide suites of facilities supporting team teaching, variable groupings, multi-class teaching, or other variations now finding their way into schools and colleges.

In this study, several facility types result from renovating the two-classroom unit: a large-group room seating 50, a seminar space seating 20, a 6-man conference room, and two project areas. In all rooms, media become available for appropriate uses; in the seminar and project rooms, media are used primarily in the form of television, cartridge projectors, and overhead projection. In the larger rooms, media modules for two simultaneous images plus television and normal chalk and tackboard areas are available.

Needless to say, this suite would require extensive rebuilding and re-equipping; it would be an expensive undertaking. It would cost practically as much to remodel this space as to build new school rooms. However, the provision of such a suite with its variation in functions and groupings and permitting extensive use of media, may be the most significant step any school or college can take within the context of its existing instructional space.

PLAN *scale: 1/8" = 1'-0"*


existing classroom partition
overhead projection & teacher's station
TV receivers
media modules
medium group
TV receivers
project areas
seminar
stepped floor
large group

RF RESOURCE FACILITIES

No other educational facility is receiving more attention today than the library and its descendent, the resources center. There are many concepts and philosophies for the new form of the library, and as is appropriate in a time of change and innovation, the form of the library is certainly not set. One fact is certain; the library (it will be called the resources center from here on) is more than a repository for books and printed materials available for checkout or for use by students at long, drab tables with stiff chairs. The functional characteristics of the library are still present—the acquiring, cataloging, indexing, storing, retrieving, use, and restoring of information, but the information has taken on many new forms. It is in the form of books, periodicals, and standard references, but also films and slides, audio tapes and programs, video tapes and kinescopes, film strips and miniaturized equipment. The problem is how to handle these various types of resources logistically, and still have them readily available for student use as required by the educational philosophy of the institution.

It is certainly the educational philosophy and the way it is translated by faculty and staff that dictate how a resources center is used. It may be simply a more complex library—a place where students come and check out materials as required to complete assignments. It may also be the whole focus of the educational program for the institution—a place where a student comes and learns independently, and a place from which information is delivered to students throughout the entire school plant working in a number of different learning situations. More and more, the resources center is becoming the focal point, philosophically and physically, for many new school plants. Whatever the philosophy, it must be spelled out in terms of educational objectives before any architectural planning can begin.

A resources center may function as part of the system of education within a school plant in a number of different ways: Diagram A indicates a "little school" or "school-within-a-school" concept in which each subdivision contains a resources center, either discipline-oriented or general in content. In such an institution, the resources center will contain independent study facilities and seminar and project rooms, as well as the resources themselves. These resources centers may be interconnected for call-up of material from any one of them, and in turn, all

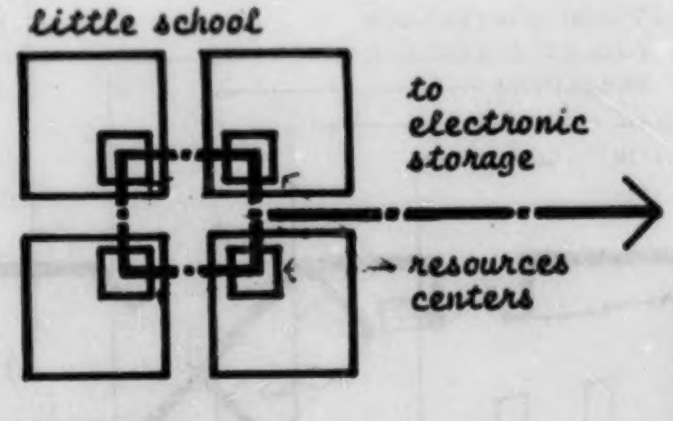


DIAGRAM A

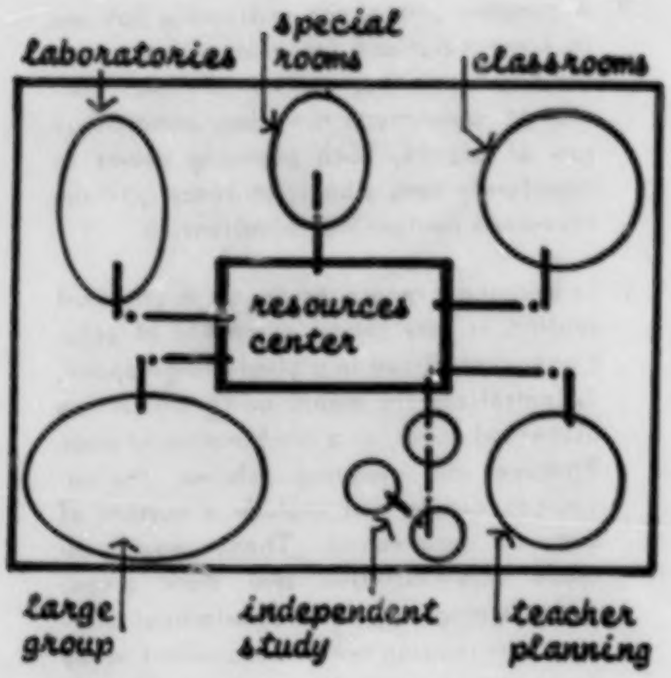

laboratories
special rooms
classrooms
resources center
large group
independent study
teacher planning

DIAGRAM B

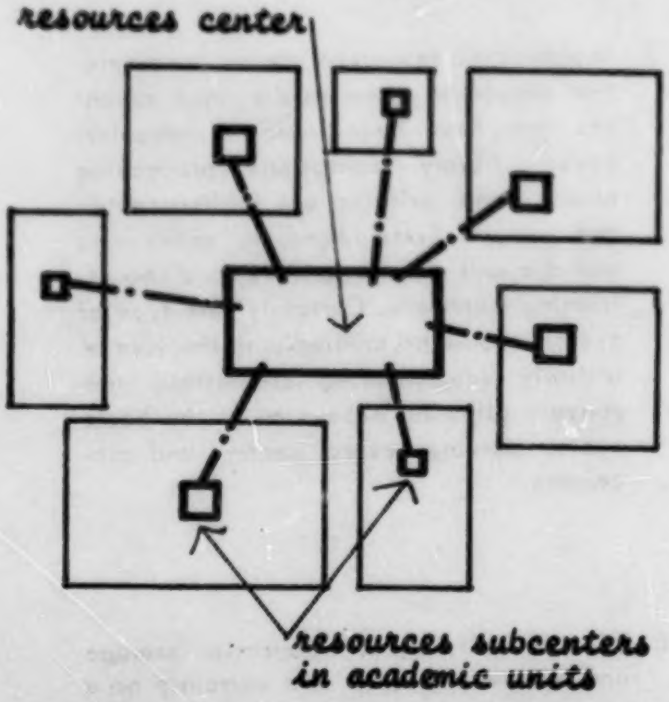

resources center
resources subcenters in academic units

DIAGRAM C

the resources centers may be connected with a large, regional electronic storage and retrieval facility.

Diagram B indicates a single resource center as the focus of the school and serving the entire school. Not only would students come to the resources center to use the resources, but audio and video materials would be distributed from the center to carrels and independent study facilities, classrooms, seminar rooms and other kinds of spaces throughout the school plant. In this case, a student does not have to come physically to the resources center to partake of its resources.

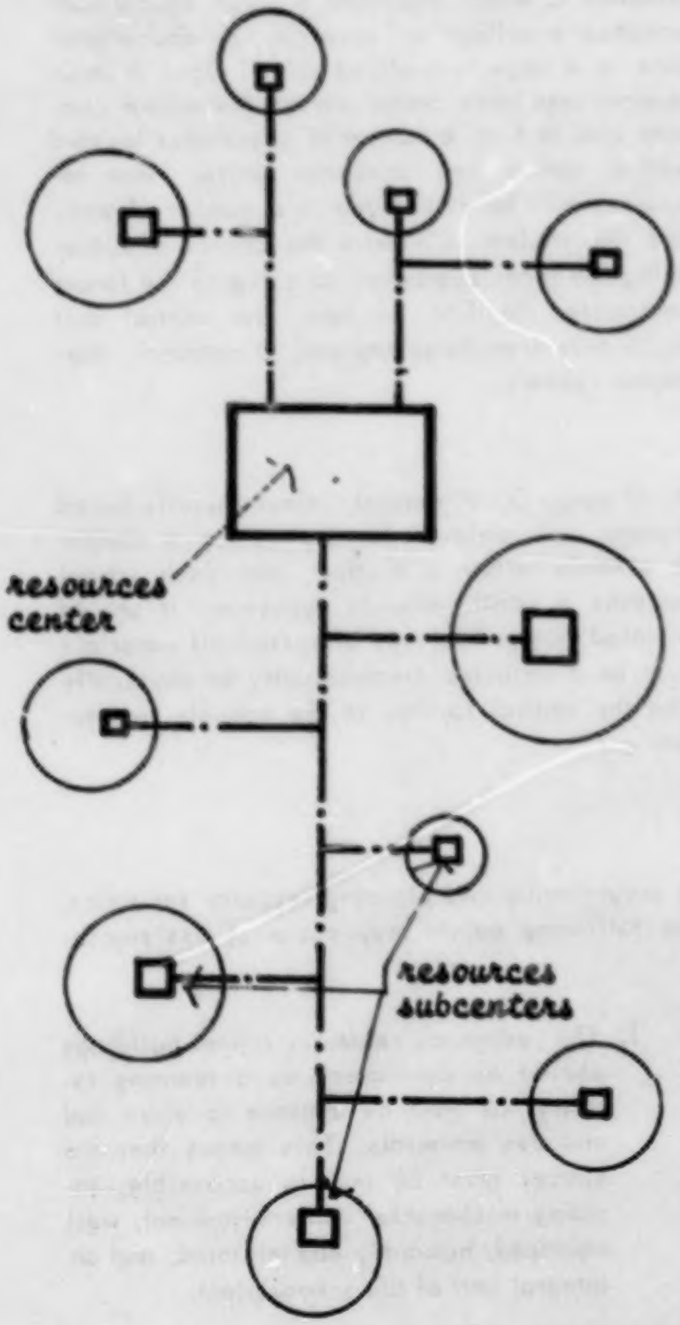

resources center
resources subcenters

DIAGRAM D

Diagram C might illustrate a large educational complex—a college or university, an educational park, or a large centralized school plant. A large central resources center serves the entire complex and, in turn, a number of subcenters located within specialized academic units. Here resources will be distributed in a number of ways and the student will have the choice of either using his local subcenter, or going to the larger centralized facility. In turn, the central unit could draw from large regional or national information centers.

In Diagram D, a central, electronically-based storage and retrieval facility serves a number of schools within a district, and each school contains a small resource subcenter. It should be noted that in this type of system all materials must be distributed electronically or physically from the central facility to the schools for student use.

In programming and planning resource facilities, the following points may prove of assistance:

1. The resources center in school buildings should be considered as a learning facility, as well as a place to store and and use materials. This means that the spaces must be readily accessible, inviting in character and environment, well equipped, humanely administered, and an integral part of the school plant.

2. Independent study and learning facilities within or associated with resources centers are more than "electronic carrels". A comfortable lounge chair, some carpeted flooring, a seat at a table, tables with low dividers, small separate rooms, and writing cubicles are all independent study facilities and should be represented along with the electronic carrel. There should not be a choice of only "wet" or "dry" carrels, but a mixture of these and other accommodations for individual students learning with resources.

3. A concern with space utilization has led to some solutions for independent study facilities in resources centers that consist of monotonous row upon monotonous row of carrels. Such planning seems to completely deny a basic philosophy of the resources center—individualization.

4. In bringing a resources center to physical reality, it may follow a variety of solutions—centralized in a single large space, decentralized in small units which are dispersed about, or a combination of both. Whatever the planning scheme, the resources center will include a number of common components. These would include administrative and work areas, media storage, book and periodical storage, soft reading area, independent study area, simple production and reproduction facilities, and conference, project and seminar facilities.

5. In planning a resources center, consideration should be given to the rapid advances that have been made in computer-based library operations processing acquisitions, printing out bibliographies and special lists, handling check-outs and due and reserve notices, and requisitioning materials. Certainly this type of system should be studied with the idea of initially incorporating compatible components allowing expansion of the basic system serving several centers and subcenters.

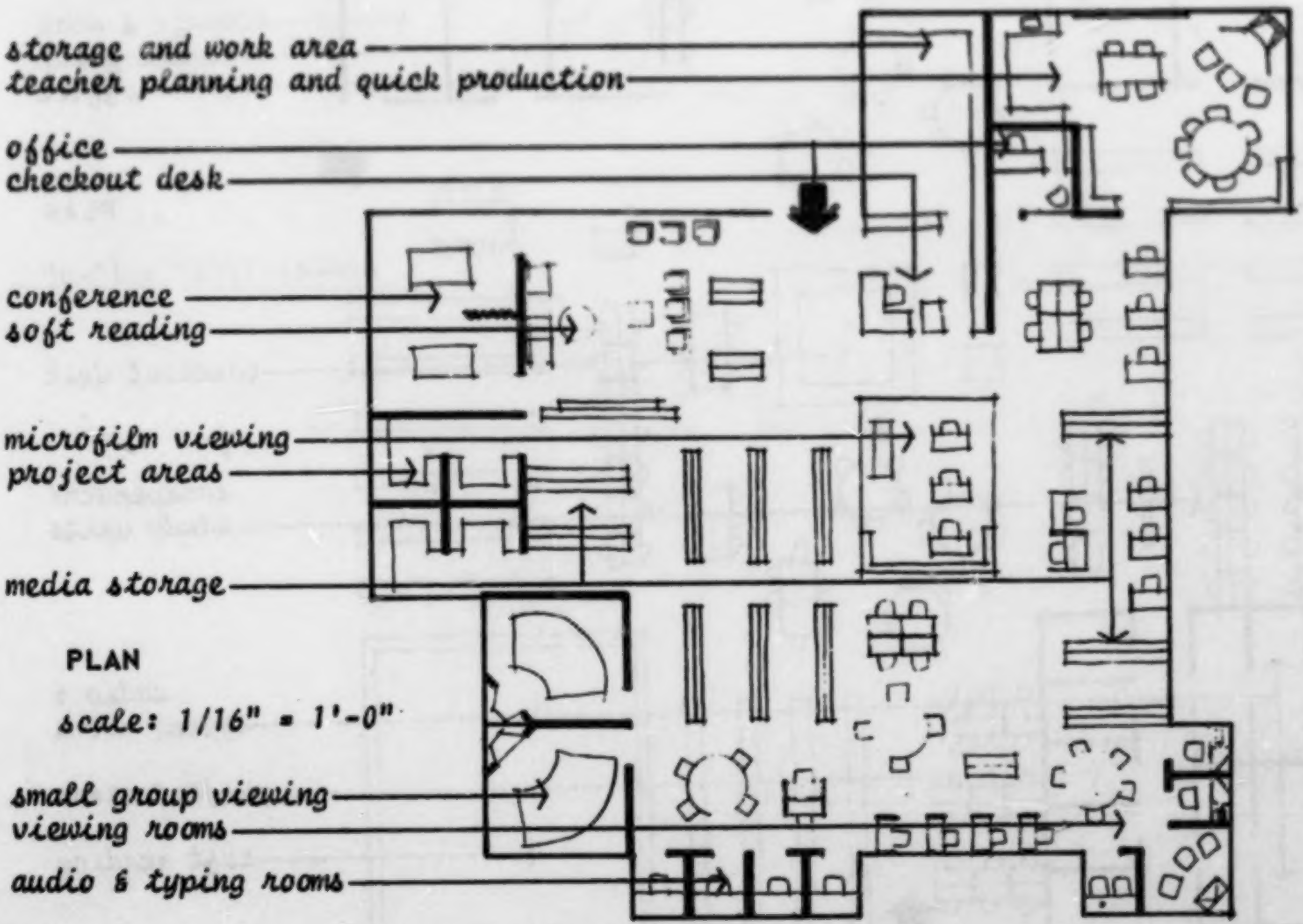
6. Electronically based information storage and retrieval systems will certainly be a planning factor in designing resources centers. Some carrels will be "wired into" such systems for instant access to information, and in some cases, the resources centers may be part of the "input" into a retrieval system. The hardware and economies of such systems have not been clearly defined, and they are not universally available. However, planning must anticipate their eventual role.

RESOURCE FACILITY STUDY RF-1

This resources center combines many different types of facilities into a single center. As such, it would form the resources focus for a high school, middle school, and with modifications, an elementary school. In addition, it has many of the characteristics appropriate for a resource subcenter found at many points in a large educational complex.

The central area consists of storage facilities for books, media, independent audio visual equipment, and a variety of facilities for independent study and learning—soft reading areas, electronic carrels, reading and writing carrels, reading tables and chairs, etc. Surrounding this center are a number of significant supplementary facilities. Small viewing rooms provide for independent and team work using projected media. Typing or audio rooms provide soundproof cubicles for individual use. Seminar rooms, project areas, and conference facilities all provide for the use of various kinds of resources by small groups working together. Naturally, storage, workrooms and office facilities must be provided, as well as reference files, indexes and a control center. Finally, the teachers planning, preview, and simple production facility is provided as part of this particular resources center.

This center would be located at the heart of a school plant with other educational facilities surrounding it, all easily accessible.


storage and work area
teacher planning and quick production
office
checkout desk
conference
soft reading
microfilm viewing
project areas
media storage
small group viewing
viewing rooms
audio & typing rooms

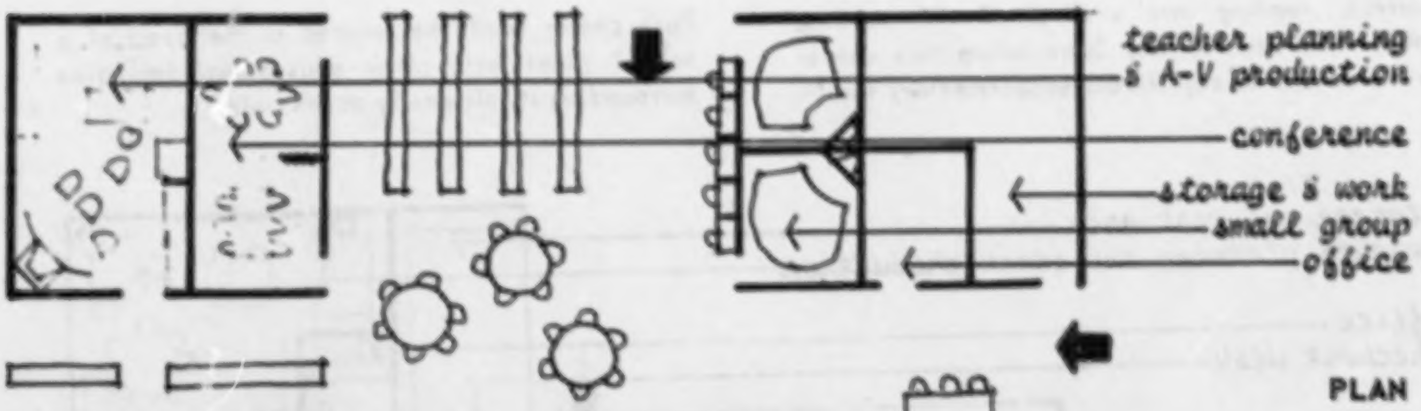
PLAN

scale: 1/16" = 1'-0"

RESOURCE FACILITY STUDY RF-2

This resources center would be appropriate as a subcenter in "schools-within-schools". It can be either a general resource subcenter, or discipline-oriented, and provides for long-term, independent student utilization. Carrels for audio and video use, and reading and writing, are provided, as are a soft reading area, tables and chairs, and enclosed and semi-enclosed rooms used for typing and recording. The adjunct facilities include small group viewing rooms, project rooms, conference rooms, a small teacher production facility, and office work and storage space for the administrators of the center.

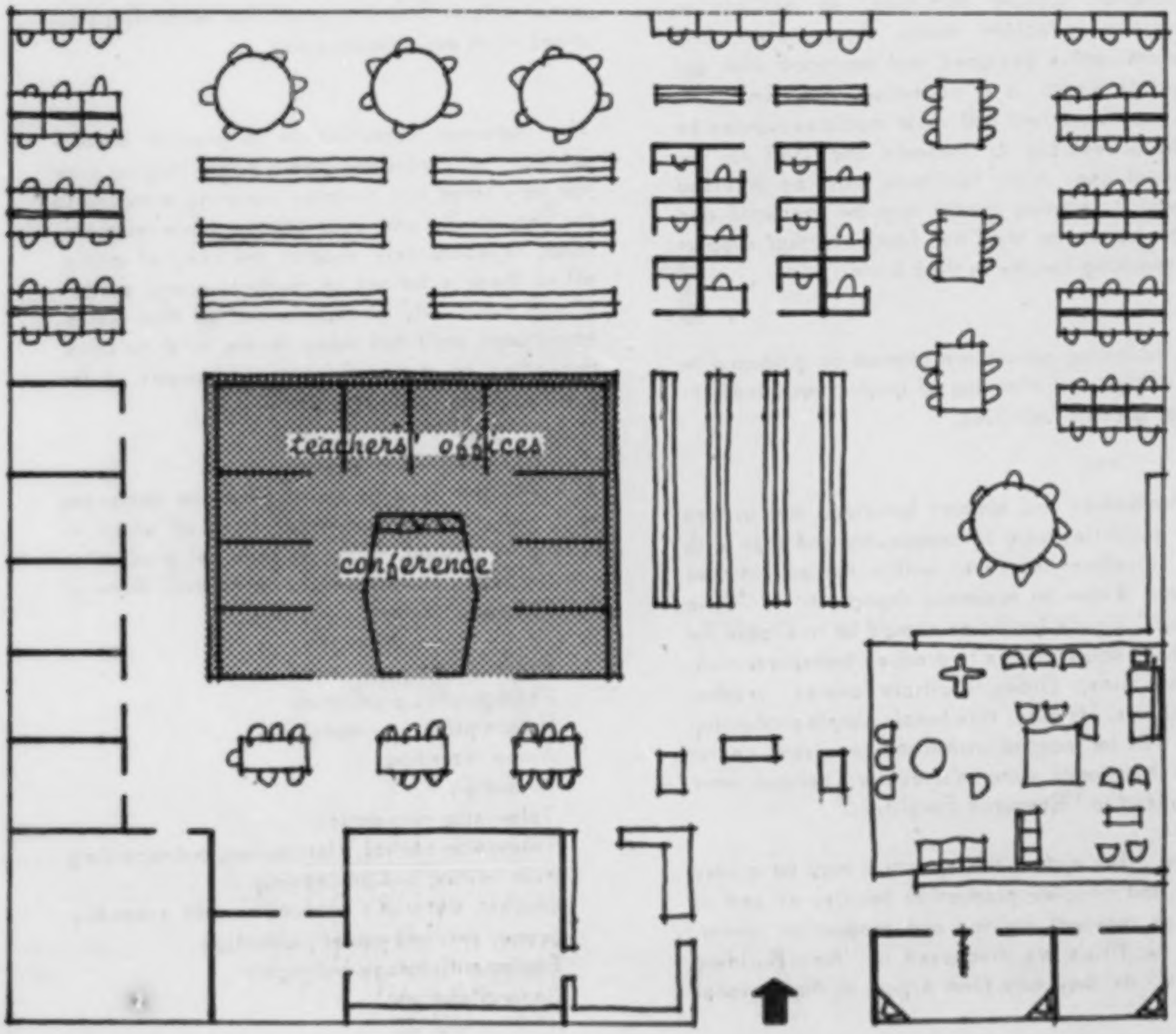
As a resources subcenter, this facility would be surrounded by other types of learning spaces, and the line of demarcation between the resources and other educational facilities would be undistinguishable. In fact, if properly designed, students would move between these spaces freely without feeling that they are moving from one educational world to another.


teacher planning
& A-V production
conference
storage & work
small group
office
PLAN
scale: 1/16" = 1'-0"
checkout desk
independent
study units
audio &
typing rooms
project areas
soft reading

RESOURCE FACILITY STUDY RF-3

This resources center introduces the basic philosophic concept that teachers themselves are significant resources and coordinators in the use of resources. Therefore, they should be part of the resources center and this study includes a teacher planning and conference suite composed of teachers' work cubicles surrounding a common conference and work area. Here students may come on appointment, or on a "drop-in" basis, and consult with their instructors as readily as they could consult with the other resources contained in the center. This type of facility would be most appropriate for a nongraded or continuous progress-type of educational philosophy. It might serve either as a resource subcenter in a "school-within-a-school" concept or as the basic resources center in a school which is moving towards continuous progress, but which is initially designed for a significant program in team planning and teaching.

The remainder of the resources center includes accessibility to a variety of resources which may be used individually and in small groups.



PS PRODUCTION – SUPPORT FACILITIES

To reiterate a basic point, the effective and efficient utilization of learning media in education requires three broad types of space—learning spaces, resource facilities, and production-instructional support facilities. In addition to classrooms, lecture rooms, laboratories, and seminar rooms designed and equipped with appropriate media, it is necessary that film, slide and tape materials and other media resources be made accessible to students and staff for individual use. Also, facilities must be provided in which learning media may be produced and which house the staff and functions that support the teaching faculty in their work.

The following points are offered as guidance in the design and planning of productional-instructional support facilities:

1. Production and support functions and in turn their facilities vary in complexity and size with their location and level within the educational system. Within an academic department or "little school" simple facilities should be available for teachers and students to produce transparencies, photo-copies, slides, multiple copies, graphs, and charts. Usually, this local, simple production area will be located within the resources center or instructional materials center; several were discussed in "Resource Facilities."

At the other end of the spectrum may be a very large and complex production facility as part of a large regional service and production center. Such facilities are discussed in "New Building Types" as they may form a part of the regional service center or educational laboratory. In between these two extremes are production centers which will serve a university, a college, a large high school, several schools within a district, an entire school district, or all the institutions located in an educational park.

The important objective is to provide several echelons of production and support ranging from the very large and complex covering a region to the very simple and local serving a few teachers. Also, to adequately support the uses of media, all of these echelons of production and support should eventually be represented so that the instructional staff has many levels to draw upon, depending on the complexity and needs of the particular learning situation.

2. Production support centers may be composed of a variety of components, each of which is related according to the echelon of production and the types of services to be offered. Some of these components are:

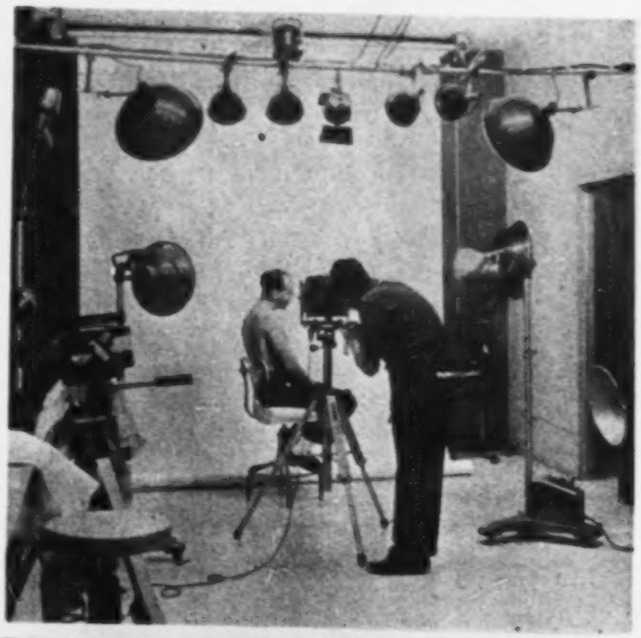
Graphic arts production
Photographic production
Motion picture production
Audio recording
Animation
Television origination
Television control, distribution, and recording
Film editing and processing
Graphic materials production and assembly
Scene, set, and model production
Equipment storage and repair
General storage

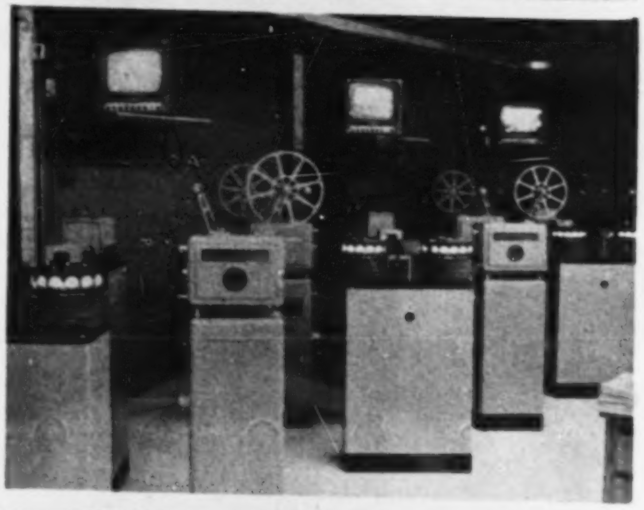
Administration and offices for production staff and visiting faculty and teachers
Conference and preview facilities
Film and tape materials and equipment storage and distribution.

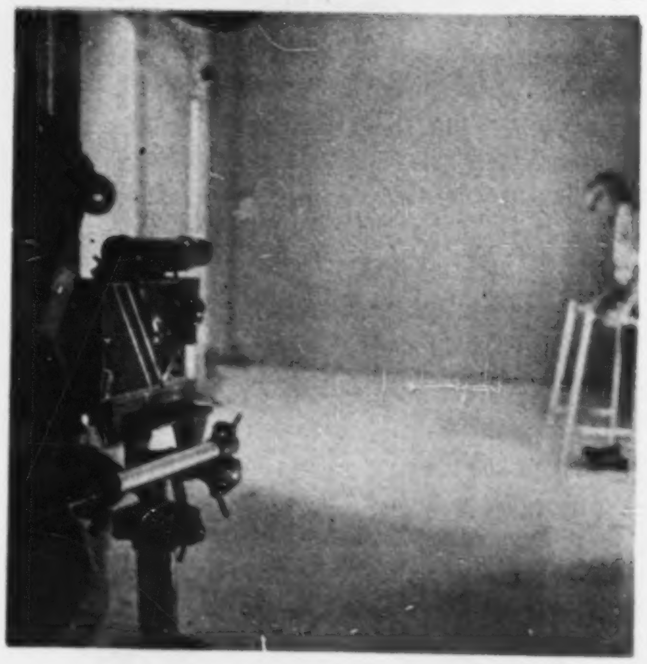
In programming a instructional support center, it is the manner in which these components are arranged and placed together that creates the appropriate center for a particular institution.

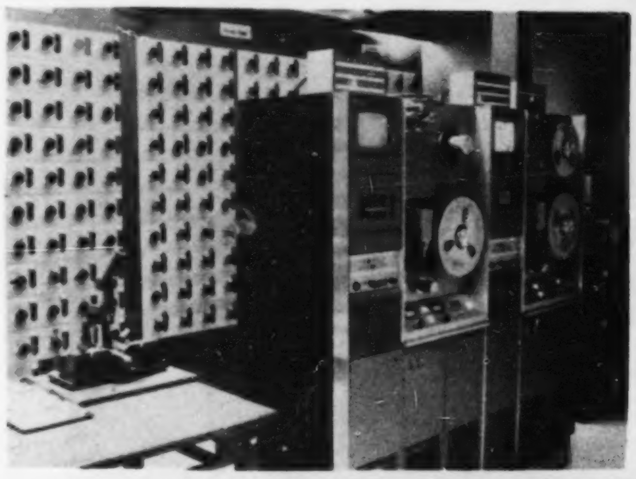
3. The instructional support center can perform several major services in addition to producing films, slides, tapes, and other instructional materials:

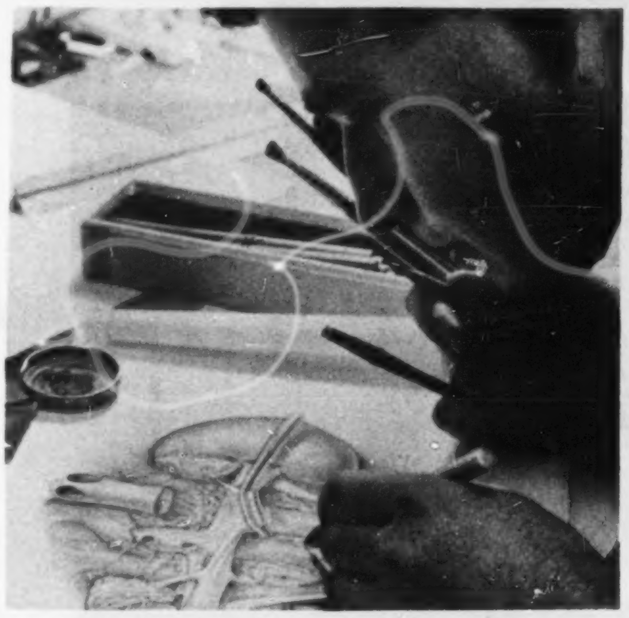
- It can design and produce materials that are not commercially available, but which are needed for specific instructional purposes.
- It can provide technical assistance to teachers and professors in using instructional technology effectively. It is this type of assistance which helps teachers overcome a fear of mechanical devices about which they have little knowledge and great anxiety.
- They can be the catalyst which causes teachers to begin planning instruction and learning together. Producing televised instruction may bring cooperation among teachers who otherwise would always function as independent entities.
- A instructional support center can provide pedagogical assistance to teachers in designing learning. The learning systems designers—the pedagogical consultants—would logically be housed within this center.
- These facilities can provide the professional focus for teachers and faculty members by making available professional references, material, journals and consultants.

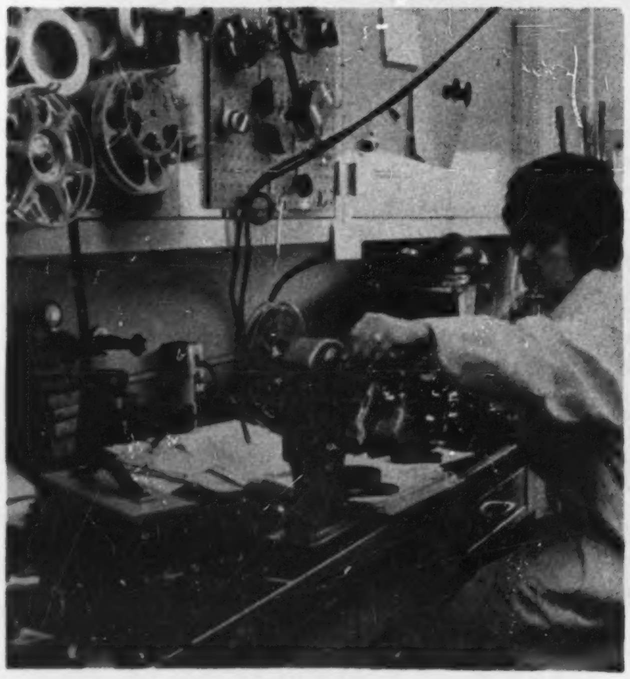












4. Instructional support facilities may be an integral part of an educational plant, or may be a separate, free-standing building or unit. In either case, consideration should be given to designing the area to permit changes in areas, and relocation of walls, services, and cables. Flexibility of this type is very important, as the functions and needs of a center will change as programs, staff and faculty develop. A "loft-space", free of interior partitions and permitting economical changes may be the best type of space.

5. One of the changes anticipated above involves the planning of TV studios. Often when studios are initially planned, the faculty will wish to provide for a class of students to be present in the studio during production. However, as the faculty becomes more comfortable with television, the need for students in the studio is less significant. The building should be designed to permit this evolutionary change.

6. Obviously there is no single instructional support facility which solves all needs at all levels. There are many, many different systems of production and support which can be diagrammed. System A indicates a regional center which supports a number of subcenters within schools throughout the system. From the subcenter further production and support activities are provided to individual classrooms, resources center, independent study facilities, and special rooms. It should be noted that within the resources center there is the small, simplified production area for teacher use. The same diagram might illustrate the activities within a college or university campus where, from a central location, major production and support feeds out into schools and departments and then into individual facilities and areas.

System B illustrates a center within a large central school which not only supports that school, but feeds into other smaller schools throughout a school district. This might be the appropriate diagram to illustrate production–support facilities within a "educational park".

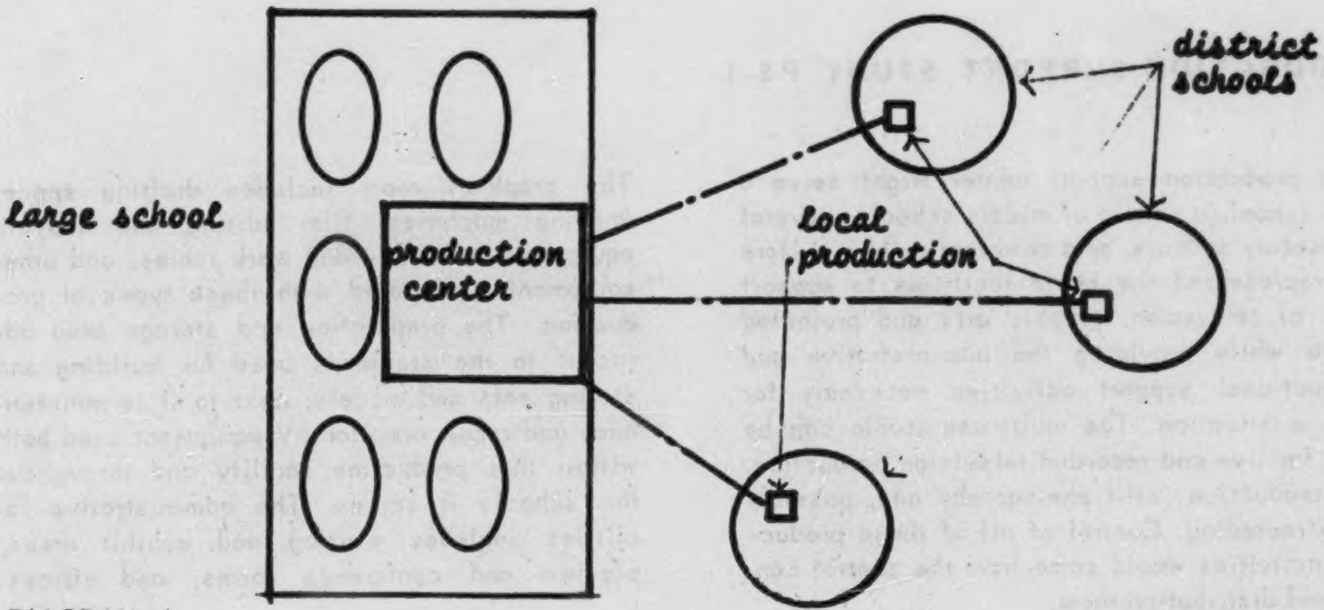
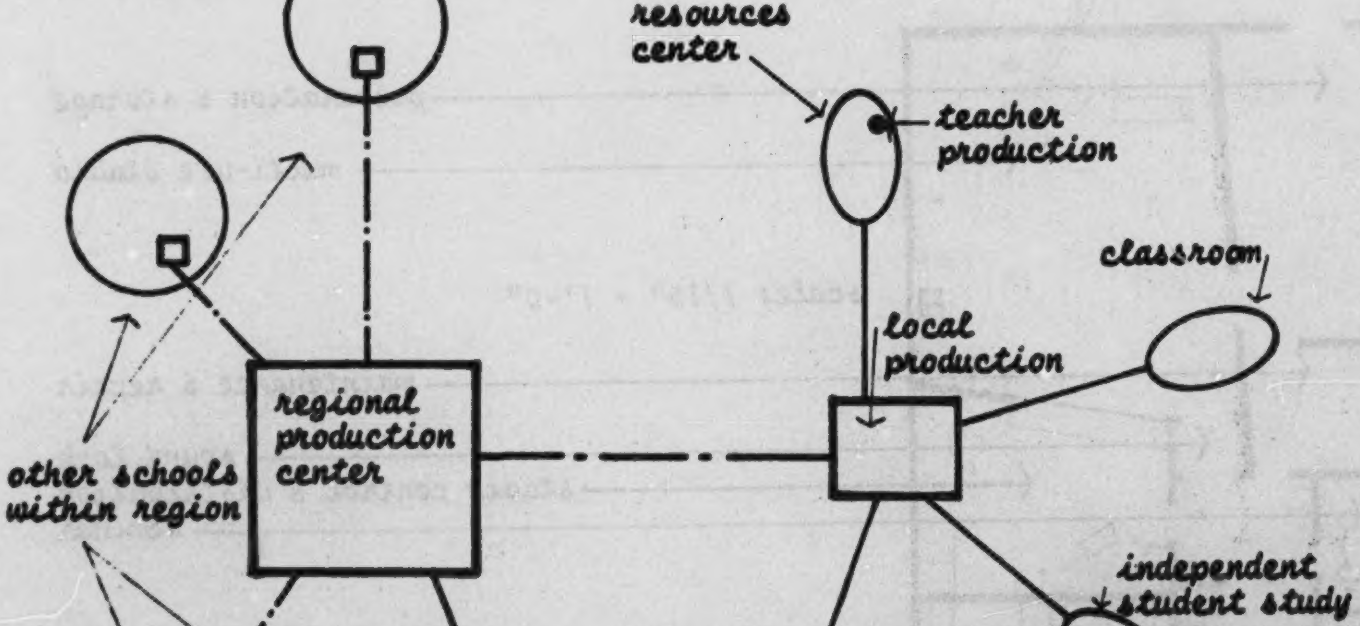

large school
production center
local production
district schools

DIAGRAM A

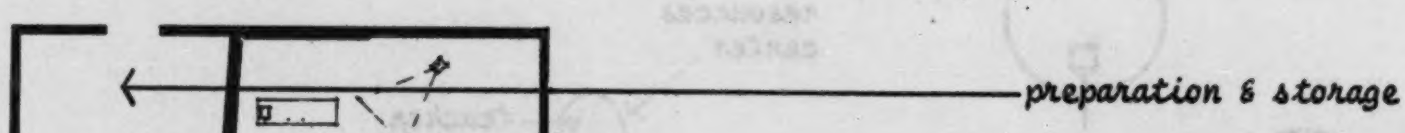
DIAGRAM B


other schools within region
regional production center
resources center
teacher production
local production
classroom
independent student study
special rooms

PRODUCTION-SUPPORT STUDY PS-1

This production–support center might serve a high school, a couple of middle schools, several elementary schools, or a combination of all. Here are represented the basic facilities to support uses of television, graphic arts and projected media while providing the administrative and instructional support activities necessary for such a situation. The multi-use studio can be used for live and recorded television production, film production, still photography and, possibly audio recording. Control of all of these production activities would come from the central control and distribution room.

The graphics room includes drafting space, copying machines, film editing and copying equipment, assembly and work tables, and other equipment associated with these types of production. The preparation and storage area adjacent to the studio is used for building and storing sets and models; next to it is maintenance and repair area for AV equipment used both within this production facility and throughout the schools it serves. The administrative facilities includes waiting and exhibit areas, preview and conference rooms, and offices.


preparation & storage
multi-use studio
scale: 1/16" = 1'-0"
maintenance & repair
sound lock
studio control & distribution
seminar
reception area
graphics production
office
conference & preview
dark room

PLAN

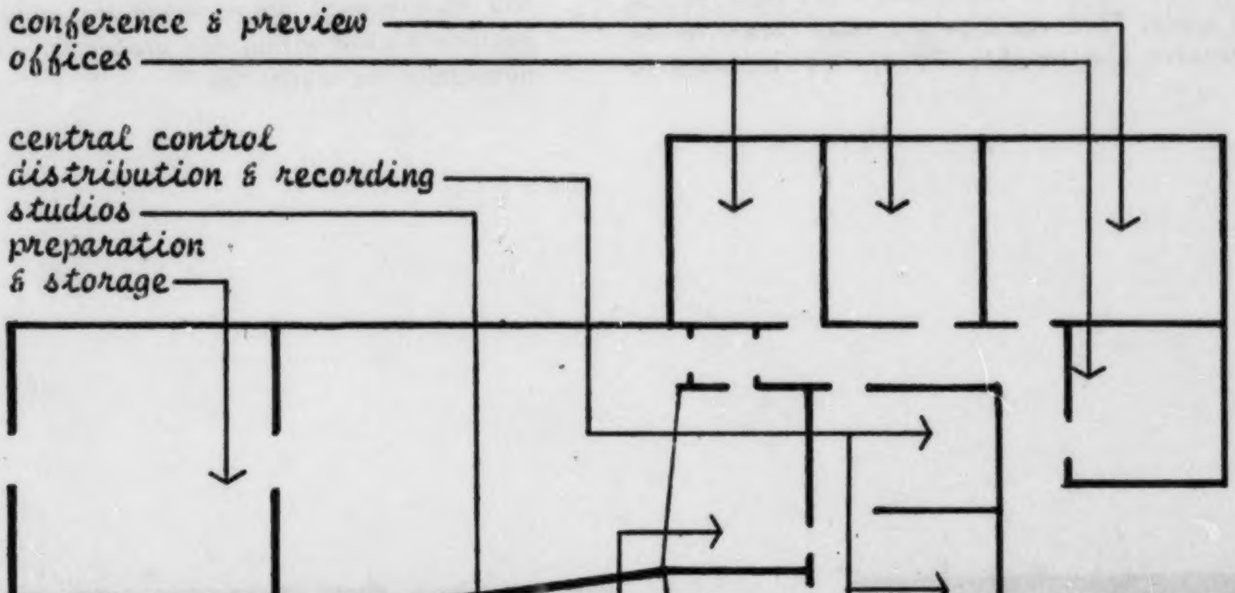
PRODUCTION-SUPPORT STUDY PS-2

This is obviously a larger and more complex production and educational support unit, particularly because it has two multi-use studios which permit more extensive television and film production. This unit could serve a number of schools in a district, the schools within a educational park, a large central school complex, a college, or elements of a university campus.

The two multi-use studios both have direct access to the storage, preparation, and workshop area, which includes the service entrance facilities. The studios themselves are served by a common television control, distribution, and recording center in addition to individual studio control facilities. Other facilities include equipment maintenance and repair; graphic production with darkrooms, work and assembly, and drafting areas; and an administrative area with offices for staff and faculty, conference rooms, and teacher preparation and preview room.

PLAN

scale: 1/16" = 1'-0"

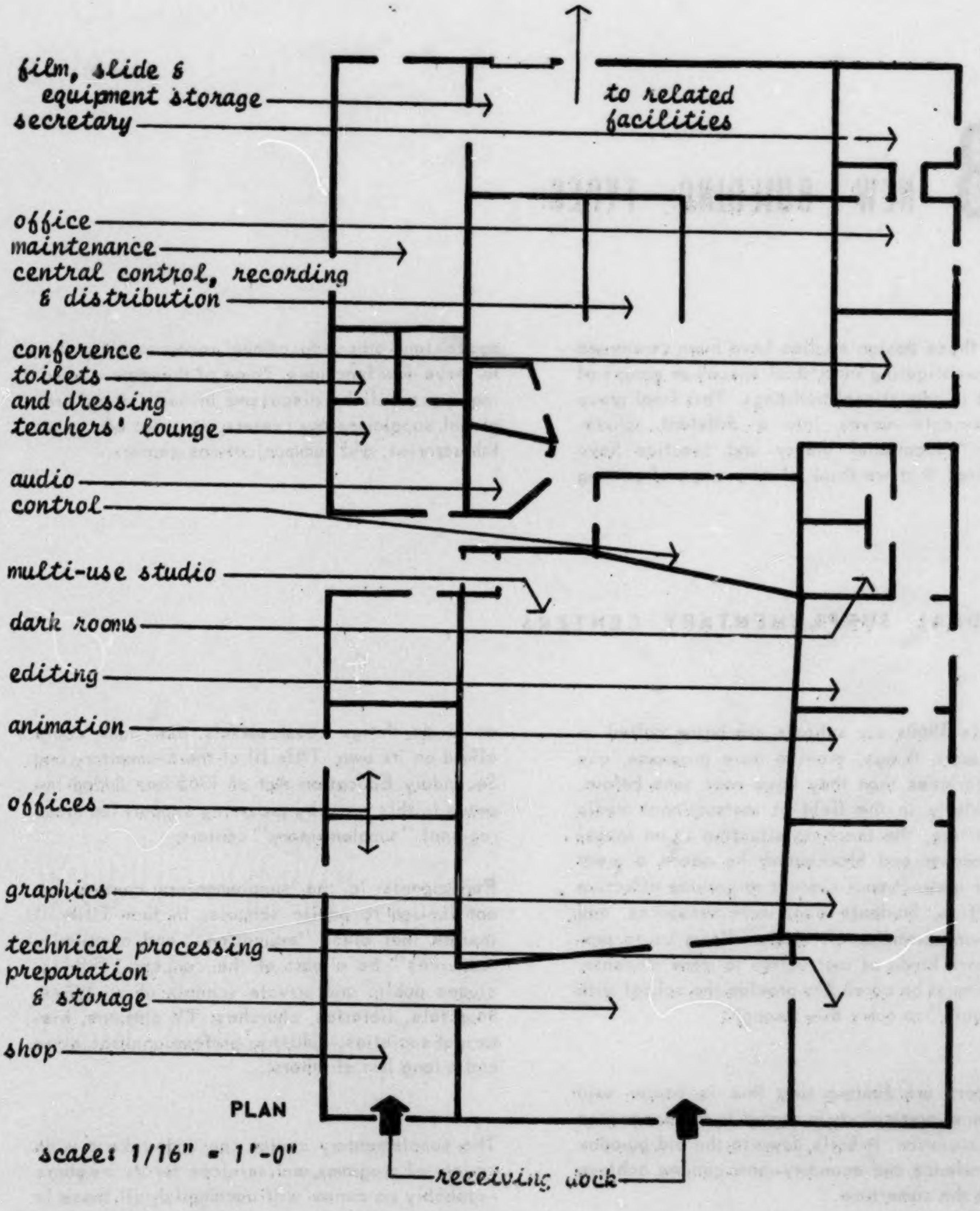

conference & preview
offices
central control
distribution & recording
studios
preparation
& storage
studio control rooms
teacher preparation
graphics production
dark rooms

PRODUCTION-SUPPORT STUDY PS-3

This large production center is designed to serve a total university or college complex, a large school district, or may form the nucleus of a regional center. The entire plan focuses around a large, single, flexible film and TV studio with facilities located around its perimeter and feeding into the large central space. The studio can be set up in a variety of different ways and would have high ceilings permitting a wide variety of lighting arrangements and the flying of sets. Several productions could be going on within this large studio simultaneously.

Next to the studio is a separate control room and adjacent to that is central control and distribution, film and slide chain, and video tape recording areas. This would be the nerve center for an extensive and flexible TV system. Included in this area are audio studios for the recording of sound on tapes and films.

On the opposite side is a preparation and storage room with direct access to the studio and to an outside shipping and receiving area. Adjacent is a workshop producing materials for use in the studio and for direct classroom use throughout the institution. Technical processing, graphics, animation, editing, and film processing facilities make up a suite of rooms to one side of the studio, with staff offices on the opposite side. The remainder is composed of an administrative center with the director's office, conference and preview rooms, film, slide, equipment storage, and an adjacent maintenance area. The storage and maintenance areas would not only service equipment used within this production center but throughout the institution.


film, slide & equipment storage
secretary
to related facilities
office
maintenance
central control, recording & distribution
conference
toilets and dressing
teachers' lounge
audio
control
multi-use studio
dark rooms
editing
animation
offices
graphics
technical processing
preparation & storage
shop
PLAN
scale: 1/16" = 1'-0"
receiving dock

NB NEW BUILDING TYPES

So far these design studies have been concerned with investigating individual spaces or groups of spaces in educational buildings. This final group of comments moves into a different sphere. Modern educational theory and practice have suggested that we think of new ways of putting spaces (and other educational resources) together to serve new functions. Three of these new building types will be discussed in some detail: regional supplementary centers, regional education laboratories, and communications centers.

REGIONAL SUPPLEMENTARY CENTERS

In these 1960s our schools are being called on to do more things, provide more programs, use more services than they have ever done before. Particularly in the field of instructional media is this true; the teaching situation is no longer just teacher and blackboard; he needs a great deal of instructional support to provide effective instruction. Students want more resources, and they want them faster. Media allows us to provide more kinds of instruction to more students, but we must be careful to provide the school with the "tools" to carry this through.

Educators are finding that this is easier said than done—particularly in regard to the economics of the situation. It boils down to the old paradox of excellence and economy—how can we achieve both at the same time.

One of the answers to this problem has been in regional development of instructional resources, services and programs. Schools and other institutions and community agencies are getting together to do things cooperatively that none could afford on its own. Title III of the Elementary and Secondary Education Act of 1965 has added impetus to this trend by providing support for these regional "supplementary" centers.

Participants in the supplementary centers are not limited to public schools. In fact Title III insists that other "educational and community resources" be a part of the concept. This includes public and private schools of all types, hospitals, libraries, churches, TV stations, historical societies, industry, professional societies and a long list of others.

The supplementary center can undertake a wide variety of programs and services for its members—probably no center will accomplish all those in the accompanying chart, but they are all possibilities. As one of the most vital concerns in education today, the production and development of media and learning resourses will, however, be an important part of many of these supplementary centers.

In contrast to the regional education laboratories which will be next discussed, the regional supplementary centers will serve areas which are quite small—perhaps a dozen small districts (or two or three larger ones), or perhaps a small geographical area centered around a university. The advantages of these smaller-scale units are many,

- **The supplementary center remains close to its members; teachers and administrators (maybe even students) can use it as a "second home" in which to research, to consult, to experiment, to observe, and to create.**
- **Since the center is a co-operative product of local institutions, each staff member, administrator, and taxpayer has a vital interest in it.**
- **Districts, institutions and other participants can benefeit from working together on common problems.**
- **The center can serve as an educational "focus" for professionals in the region.**
- **The center can effectively disseminate research findings from other sources, and keep all participants informed on what each other is doing.**

● **PROGRAMS . .**

administration, co-ordination, staff and facilities for special programs of all kinds: gifted children, college-bound, mentally and emotionally handicapped, culturally-deprived, disabled, technical and vocational, retraining, etc.

● **RESEARCH . .**

co-ordination of regional research and evaluation programs in many fields, including dissemination of research done elsewhere.

● **RESOURCE SERVICES . .**

central acquisition, processing and collection of resources; teacher examination area; search and bibliographic services; union catalogs of materials available in the region.

● **PRODUCTION SERVICES . .**

demonstration, testing and evaluation of media; origination of radio and TV programming; film processing and photographic work; making of graphics and aids, publications, curriculum guides.

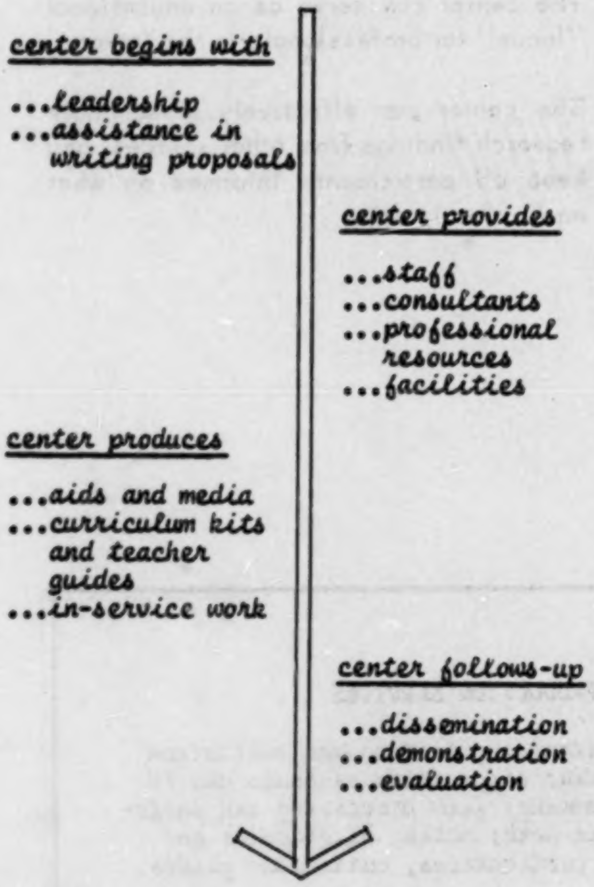
● **CURRICULUM SERVICES . .**

small curriculum development projects; outside consultants and interim staff; professional resource collections for teacher use; adjunct and consulting staff in curricular and non-curricular areas; demonstration of new materials and techniques; in-service training.

● **ADMINISTRATIVE SERVICES . .**

aid and consulting to administrators in finance, law, transportation, etc.; regional data processing center.

There is an even greater advantage to the center —it has the potential of providing a truly integrated effort. The following example shows the real value of the center in developing and implementing a hypothetical curriculum change.



center begins with

...leadership
...assistance in writing proposals

center provides

...staff
...consultants
...professional resources
...facilities

center produces

...aids and media
...curriculum kits and teacher guides
...in-service work

center follows-up

...dissemination
...demonstration
...evaluation

This concept is not new. There are already many attempts to provide regional programs, resources, and services; some are little more than country film libraries while others (like Toronto's Education Centre) provide a whole variety of services, classes, materials, and publications. Title III money will begin to fill in the gaps in our fragmented efforts so far, and the future points toward more "comprehensive" supplementary centers.

Despite the constant use of the term "center," these regional activities may not be accomplished in a central facility at all. The best possibilities for co-ordination and cross-fertilization exist in the central facility, but economics may preclude this. Many of the programs and services can be accomplished in outlying or adjacent buildings; most "centers" will probably be a combination of a central building with many of these scattered adjunct buildings housing various parts of the effort.

The types of spaces that might be included in the supplementary center are many,

- Regional Administration

  Administrative office and conference areas
  Clerical staff areas
  Regional research and conference areas
  Central records and storage areas
  Data Processing Center

- Program Co-ordination

  Administrative and staff areas
  Facilities for the programs themselves

- Resource Services

  Regional office and conference
  Professional resource library
  Search and bibliographic work area
  Central examination area for books, resources and equipment
  Central ordering and processing
  Central collection of materials for area borrowing
  Necessary work areas
  Shipping and receiving

- Production Services

  Regional office and conference
  Research, testing and evaluation
  Equipment mock-up and repair
  Radio origination studios and support

TV origination and support
Film origination and support
Photographic and film processing
Graphics center
Writing and editing publications areas
Publications mock-up areas
Central reproduction facility
Shipping and receiving

- Curriculum Services

Regional office and conference
Curriculum development and project center
Resource rooms for the various disciplines
Spaces for adjunct and consulting staffs
Student testing area
Pupil personnel services staff area
In-service training areas
  Demonstration classrooms
Exhibit areas

- Administrative Services

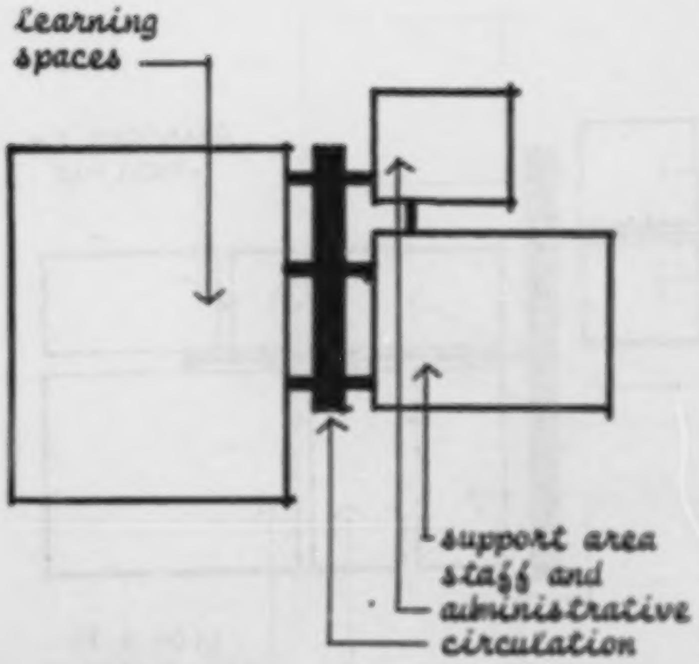
Legal advisory office
Financial planning, audit and control office
Transportation, maintenance, etc. offices
Central personnel interviewing and records center

- Supporting Services

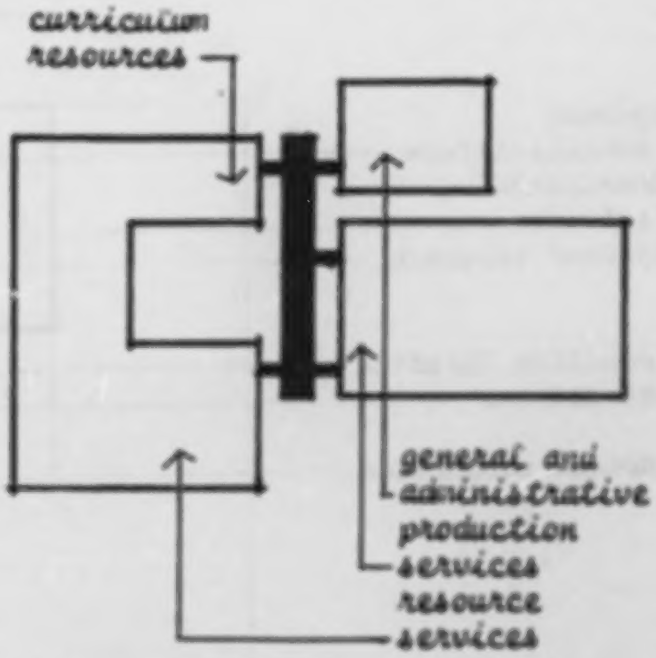
Lobby and central exhibition spaces
Large-group area
Conference and assembly areas
Cafeteria and kitchen
Central receiving and storage
Central workshop
Maintenance, toilet, services, etc.

Many of these facility types have already been discussed in other sections of this Part 3. The design of the regional center will necessarily become a process of "putting them together" with the necessary offices, conference areas, circulation, and other "support" areas.

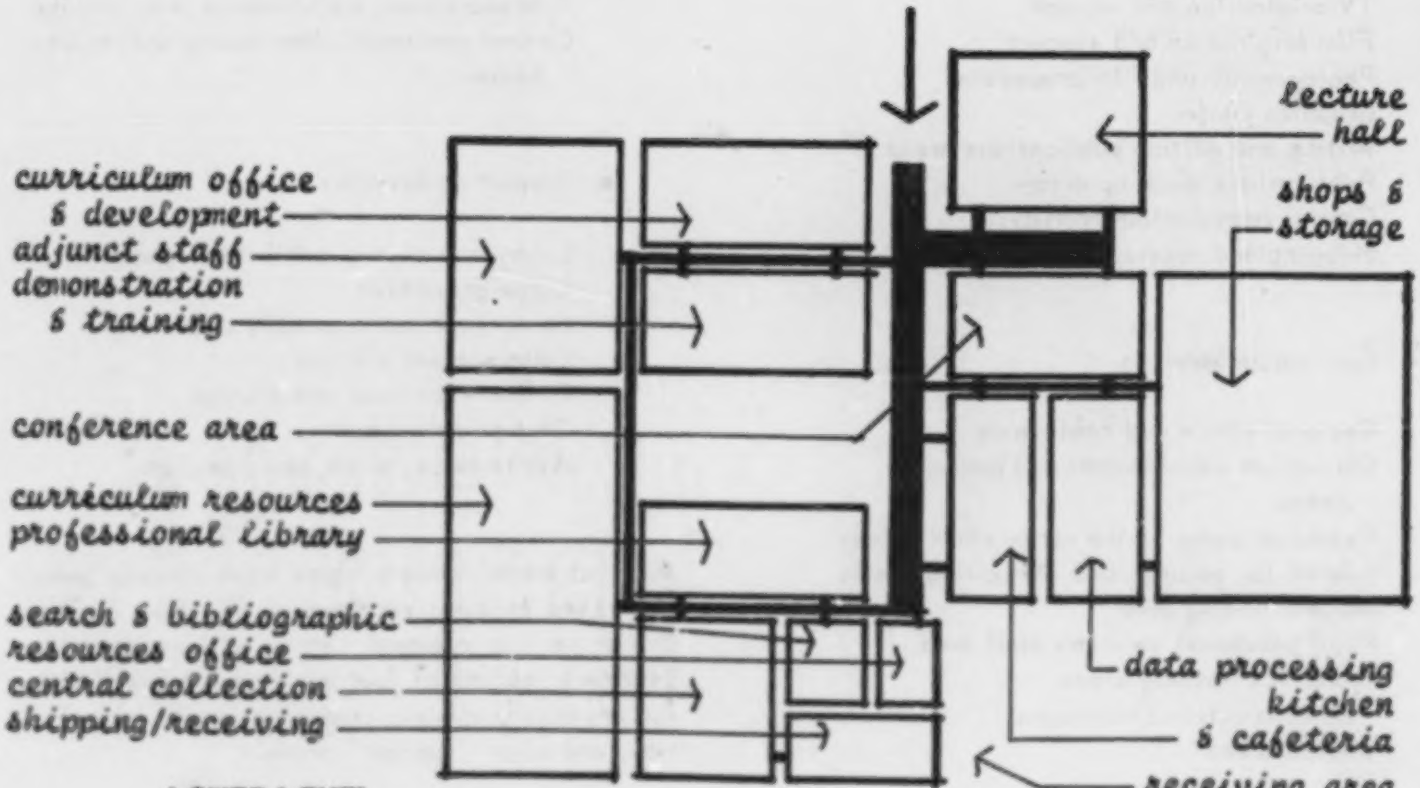
The following diagrams show the kinds of space relationships that might exist in a regional center undertaking a broad range of programs and services.


learning spaces
support area
staff and administrative circulation

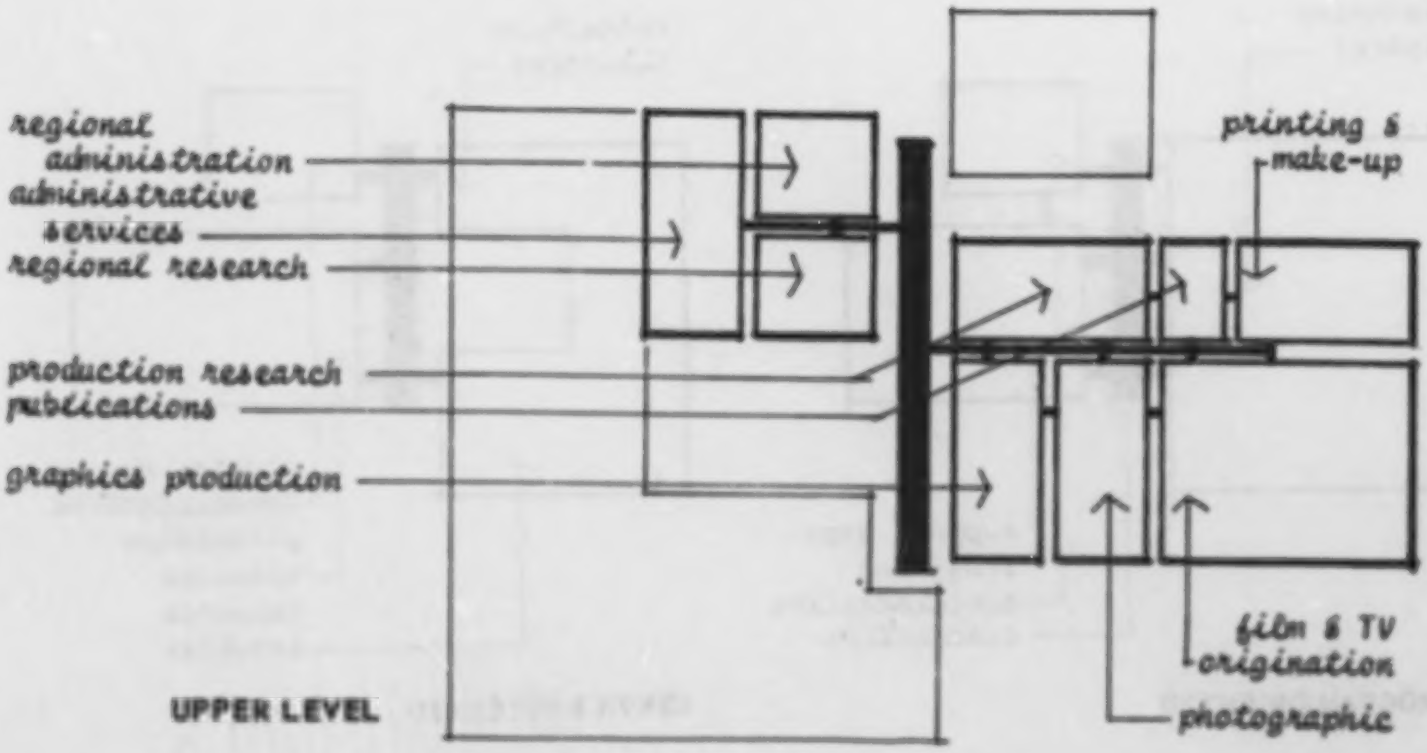
PROGRAM-ORIENTED


curriculum resources
general and administrative production services
resource services

SERVICE-ORIENTED


lecture hall
shops & storage
curriculum office & development
adjunct staff
demonstration & training
conference area
curriculum resources
professional library
search & bibliographic
resources office
central collection
shipping/receiving
data processing
kitchen & cafeteria
receiving area

LOWER LEVEL


regional administration
administrative services
regional research
production research
publications
graphics production
printing & make-up
film & TV origination
photographic

UPPER LEVEL

REGIONAL EDUCATION LABORATORIES

While the regional supplementary center can perform services and conduct localized research for its members, there is still a need for educational research on the larger scale. This larger-scale research has been growing steadily in this post-Sputnik era, but much remains to be done. Moreover, overall co-ordination of projects and widespread reporting of findings is needed if the research is to become an effective part of contemporary education.

These concerns stand behind the creation of the regional education laboratory. The laboratory steps in to undertake the research and fill the gaps always present between projects and dissemination of results.

So far, attempts at these regional research and development centers have been sporadic; some highly successful ones have been set up in large universities to attack specific educational problems, but the educational laboratory concept has yet to be adopted on any scale. Title IV of the Elementary and Secondary Education Act of 1965 calls for aid to support and maintain these kinds of centers, though, and growth in this direction is bound to result.

While these laboratories will take on different tasks, they will have some similar goals in mind,

- To carry on a concentrated and co-ordinated program of educational research activities. These activities will most likely be accomplished by eminently qualified persons, and will have widespread rather than limited application and use.
- To develop new curriculum units, with special attention to ways of supporting them. This will make media research, testing, and evaluation an important part of the laboratory's program.
- To test, evaluate and disseminate innovations on a broad scale.
- To provide direction and to encourage innovation in other quarters.
- To supplement and co-ordinate research throughout the region.
- To provide a training ground for educational research personnel.

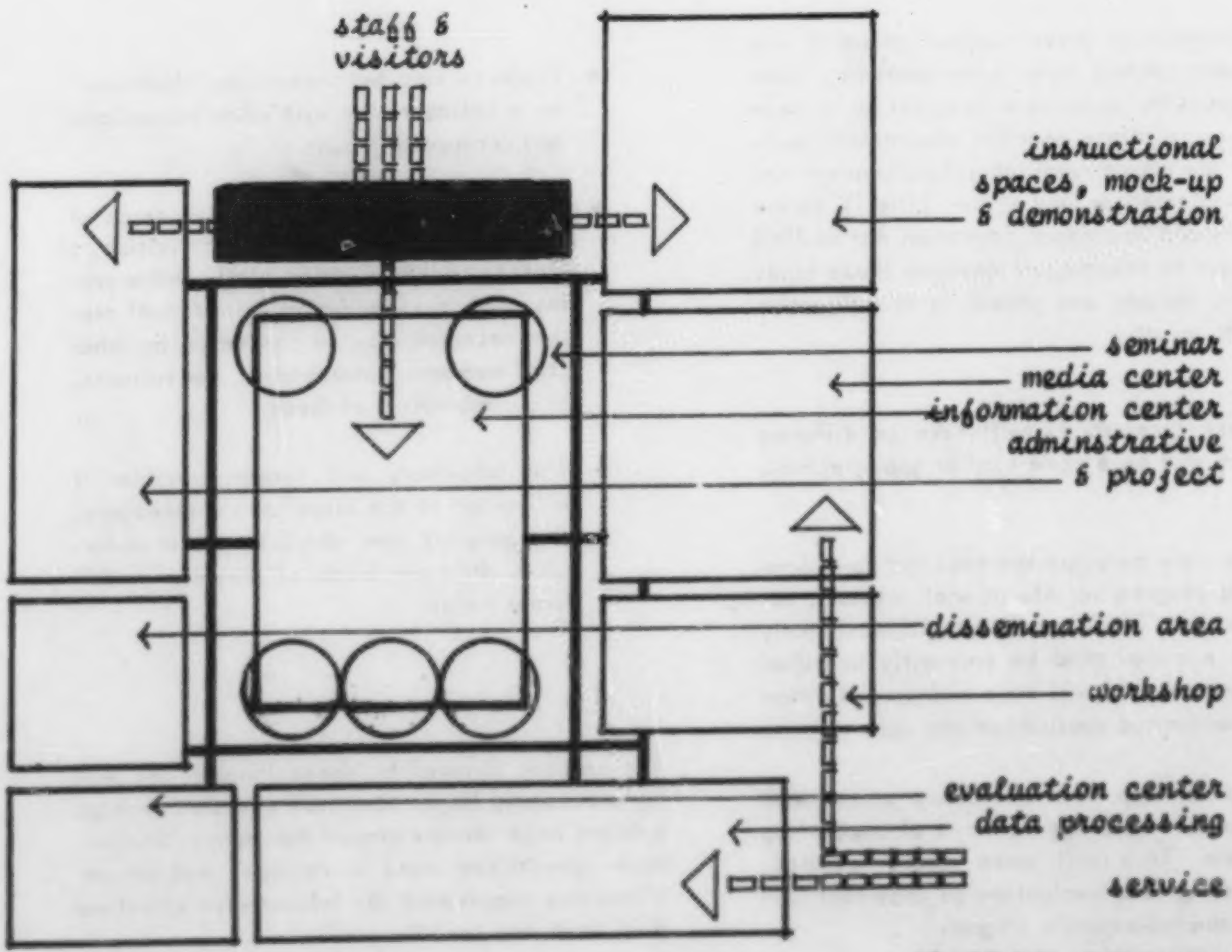
In order to achieve these goals, the various regional education laboratories will have a number of common characteristics,

- Projects may be undertaken "in-house" or in collaboration with other educational and community groups.
- Staffing will include at least a corps of administrators to co-ordinate activities, a professional evaluation staff, and a professional dissemination unit. Actual project research may be carried on by other staff members, interim staff, consultants, or a combination of these.
- The laboratory will remain flexible. It will adapt to the situation as necessary, changing its own character as it undertakes different kinds of projects in different fields.

The regions covered by these laboratories will be necessarily large; some now envision perhaps a dozen large centers around the country. Smaller, more specialized units in colleges and universities may supplement the laboratories or extend their work into specific areas.

Implications for facilities, then, are not concrete. Most laboratories will require a variety of spaces, some of which may be "eeked out" of local college buildings or those of other co-operating groups. While many of the laboratory's activities may be scattered around the region it serves, it is reasonable to believe that there will be at least a central administrative facility and staff. Kinds of facilities may include,

- Administrative and Project
  - Central administrative offices
  - Conference areas
  - Small project offices closely tied to central media and information complexes
- Central Information Complex
  - Warehouse of resources, reports, data files, etc.
  - May include Information Retrieval and Storage.
  - Entire complex readily accessible to all in the center and wired to adjunct units of the laboratory
- Central Media Complex
  - Production and origination facilities as required
  - Work areas for testing and mocking-up media units


staff & visitors
insructional spaces, mock-up & demonstration
seminar
media center
information center
adminstrative & project
dissemination area
workshop
evaluation center
data processing
service

SPACE RELATIONSHIPS

Accessible to all functions in the laboratory
Can be used for media research and support for other research

- Evaluation and Processing

  Office and conference area for the evaluation team
  Data processing center serving all units of the laboratory

- Demonstration and Mock-up

  Area for mocking-up different facility types
  Large open space that can be arranged in many ways

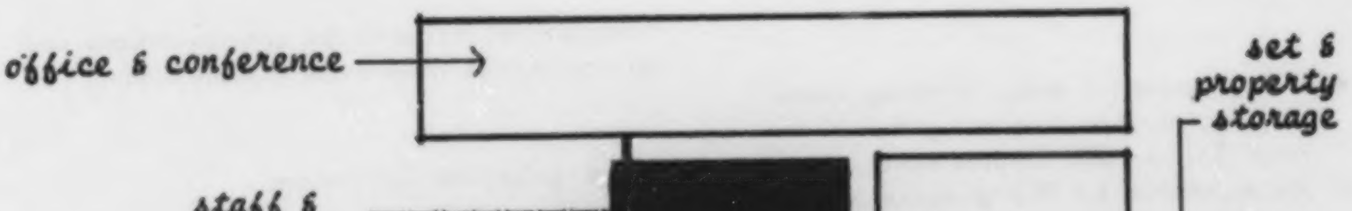
Central location for access by staff, students, visitors
Provision for visitors and viewing

- Dissemination Area

  Office area for professional dissemination staff
  Publications editing and mock-up areas
  Printing and finishing areas
  Shipping and receiving

- Service and Workshop

  Large workshop to serve for all "carpentry" activities in the laboratory
  Conventional building service spaces


office & conference
set & property storage
staff & visitors
large film studio
small film studio
storage
graphics
central control & distribution
animation
small TV studio
large TV studio
film processing
office & conference
receiving & shop
service

MEDIA COMPLEX

COMMUNICATIONS CENTERS

Another building type resulting from new thinking and practice is the communications center. The emphasis of this type of facility is on large-group instruction and on the media to support it. For this reason, it is becoming a college building, centrally located on the campus to accommodate many hundreds of students in large-groups throughout the day. It may also be part of an educational park with its facilities available to all school groups in the area.

The philosophy behind the communications center is a simple one. If the institution feels that large-group instruction fits its needs for economical but effective instruction (as many colleges do believe), it makes sense to put these expensive "supporting" function together. The communications center can economically provide:

- Shared projection areas, allowing expensive equipment to be kept together in one room. This not only insures better care of the equipment, but through consolidation, utilization rates can go up.
- Special and expensive lighting and mechanical systems. It is cheaper and less cumbersome, for instance, to air-condition one whole building rather than little pieces of many buildings.
- Special and expensive electrical installations.
- Accommodation for weird room shapes; placing one pie-shaped lecture room in many separate buildings creates waste space and odd configurations. Putting many such rooms together in one building allows the good designer to cut down if not eliminate these wasted spaces.
- Centralization of production facilities. Since many of the items produced will be used in the large-group lectures, it makes sense to consolidate all production and "support" activities in the building.
- A central "focal" point for faculty training in effectively using presentation and other instructional media.

The communications center does not become the property of any one discipline or department on campus; its use will be encouraged for all departments needing it. It will occupy a focal point on the campus, probably at the crossroads of major circulation paths.

The types of facilities the communications center may include cover those in many areas,

- Lobby and Circulation

  Include display, exhibition, reception, kitchen areas
  Generous to accommodate many large groups in the building

- Instructional Spaces

  Lecture halls (capacity determined by local programming)
  Storage and preparation areas
  Seminar and small-group rooms

- Film and TV Production

  TV and film studios
  Central engineering and control
  Dressing and ante areas
  Equipment storage and work rooms
  Prop storage and work rooms
  Staff and faculty offices
  Film processing and editing
  Preview and conference rooms

- **Graphics and Aids Production**

  Art and finishing studios
  Photo and finishing studios
  Staff and preview areas

- **Instructional Materials Distribution**

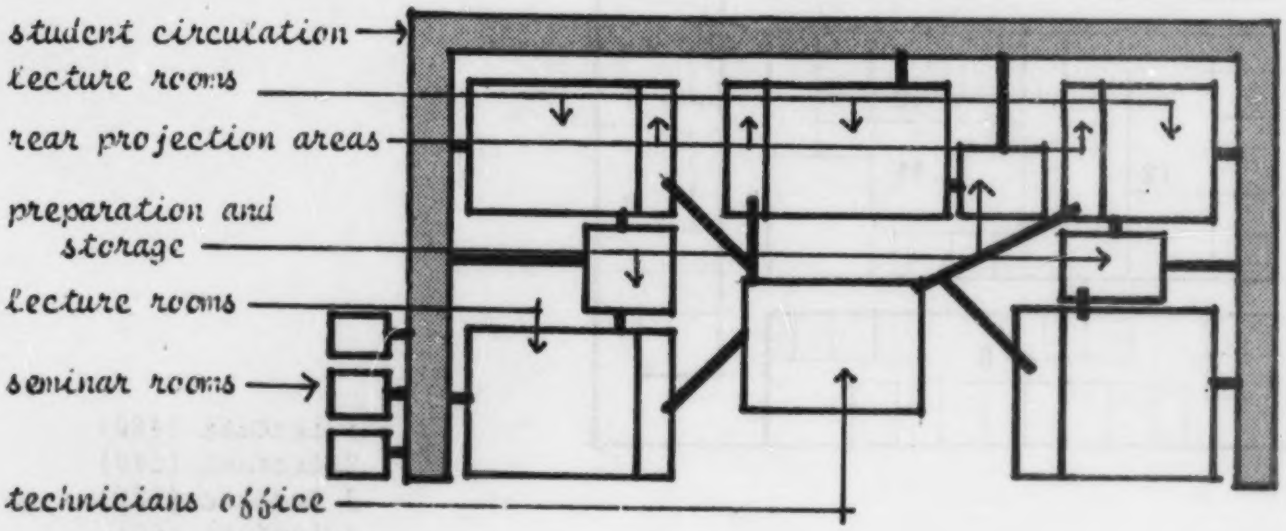
  Storage of materials and equipment
  Check-out area
  Office, records, and work area

- **Administration and Research**

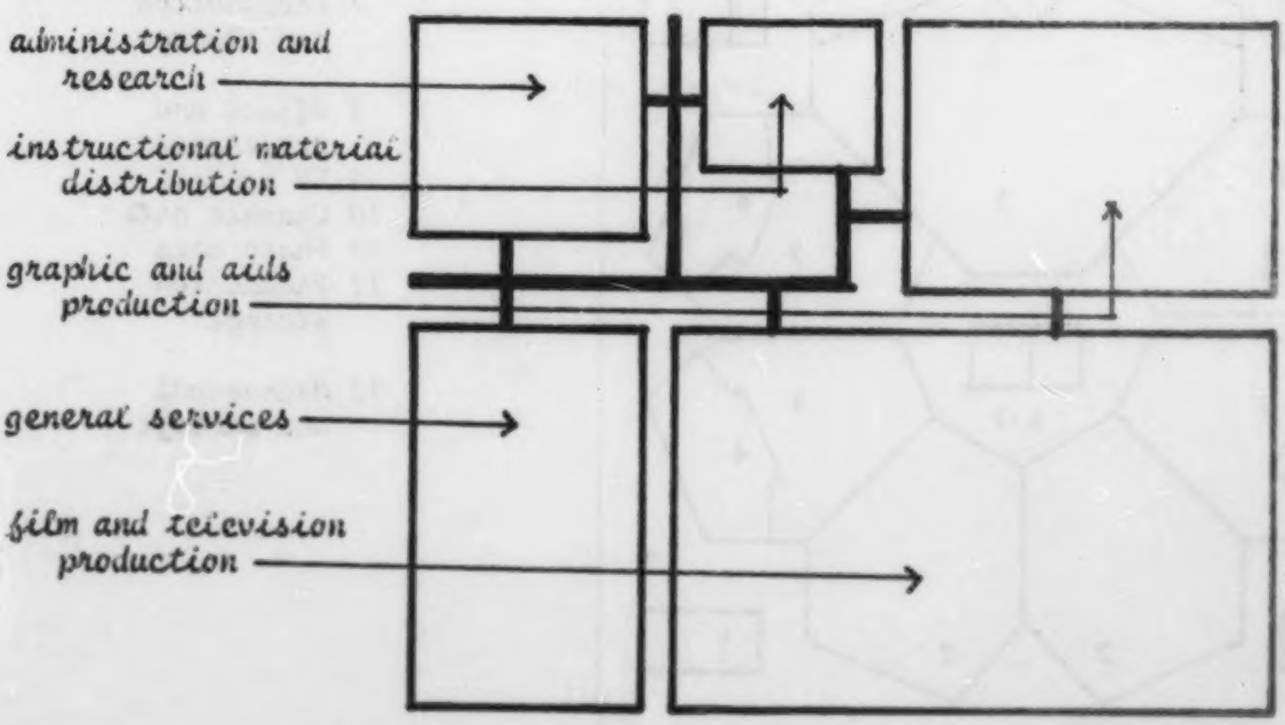
  Office and conference
  Library
  Records storage

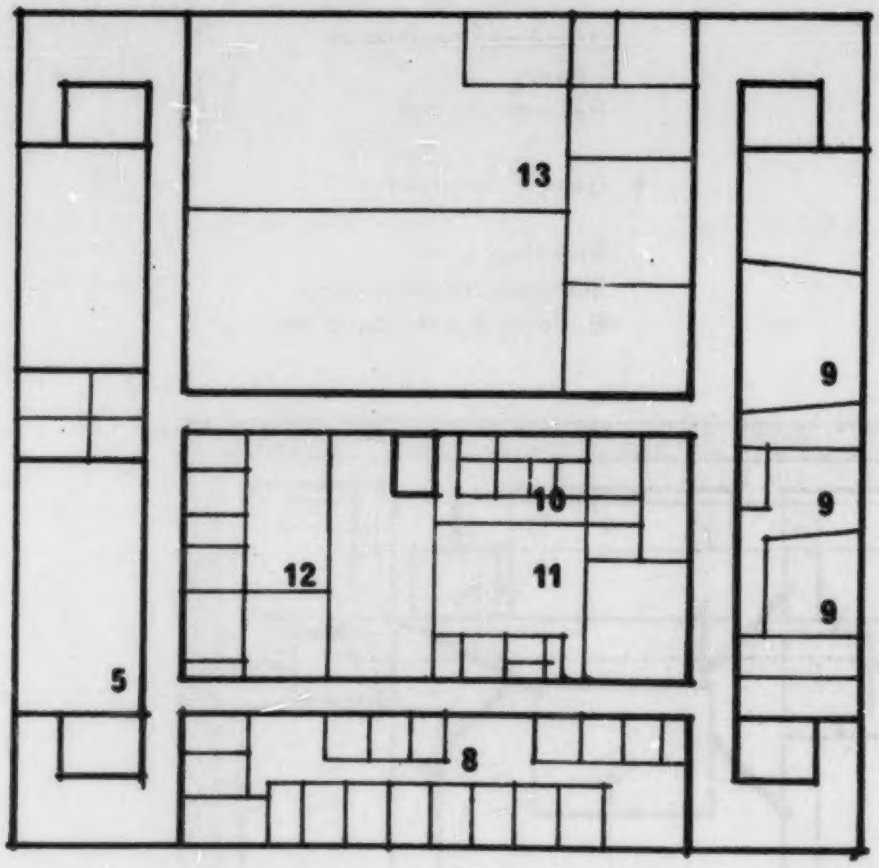
- **General Services**

  Workshop areas
  Shipping and Receiving
  Building maintenance


student circulation
lecture rooms
rear projection areas
preparation and storage
lecture rooms
seminar rooms
technicians office

SPACE RELATIONSHIPS

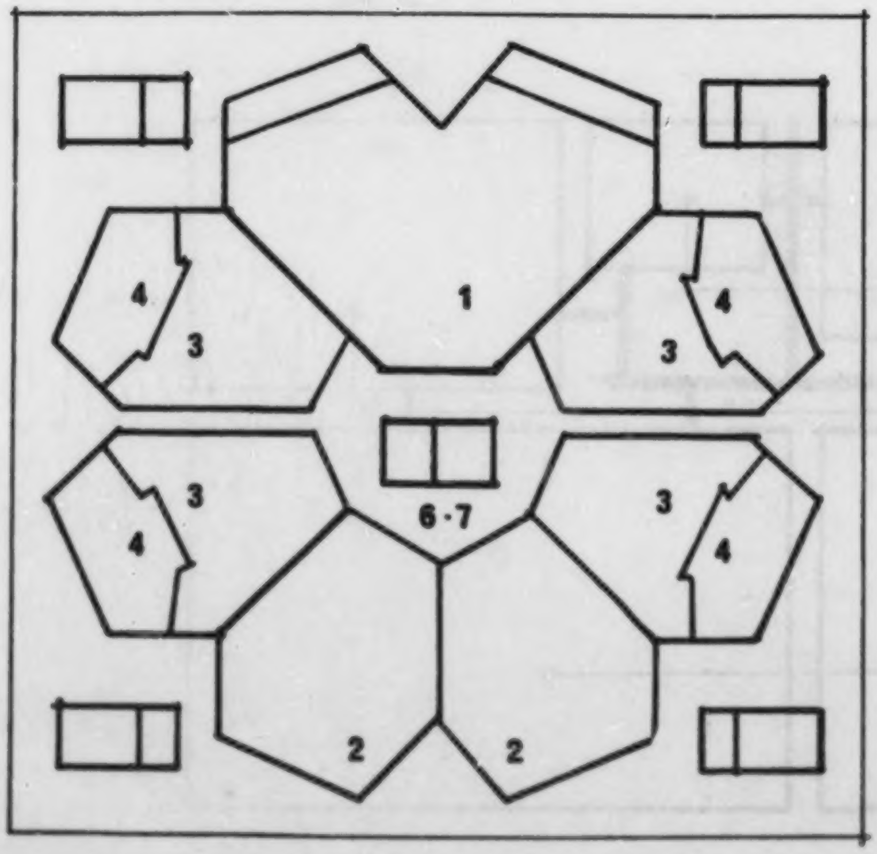

administration and research
instructional material distribution
graphic and aids production
general services
film and television production



STATE UNIVERSITY
OF NEW YORK AT
OSWEGO, NEW YORK

communications
lecture hall center

Skidmore, Owings
& Merrill, Architects



1 *Lecture (480)*
2 *Lecture (240)*
3 *Lecture (120)*
4 *Lecture (60)*
5 *Assembly area*

6 *Rear projection*
7 *Preparation and storage*

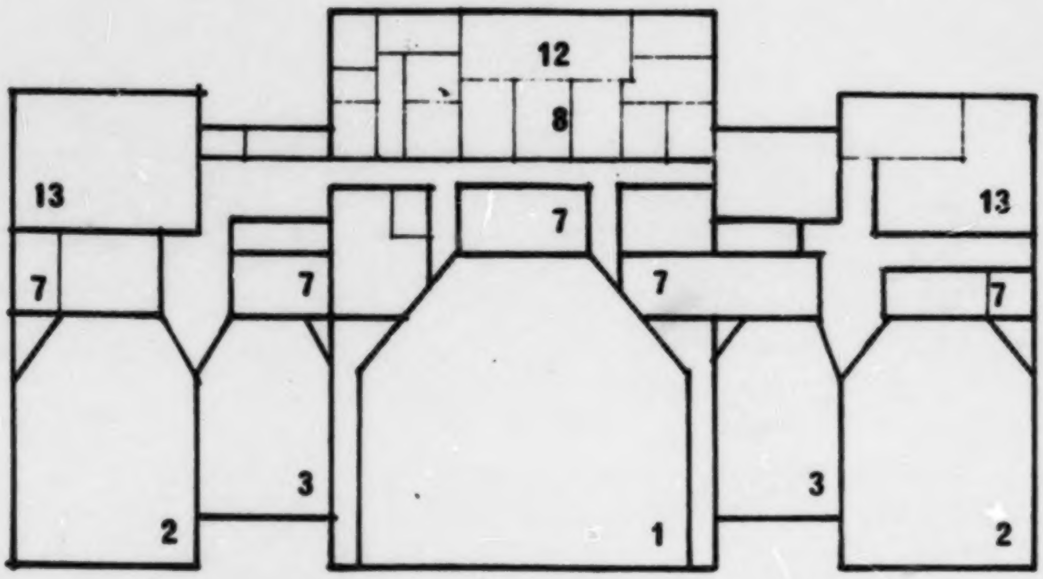
8 *Office and conference*
9 *TV studios*
10 *Graphic arts*
11 *Photo area*
12 *Production storage*

13 *Mechanical and storage*

**STATE UNIVERSITY
OF NEW YORK AT
ONEONTA, NEW YORK**

communications
lecture hall center

Toole & Angerame,
Architects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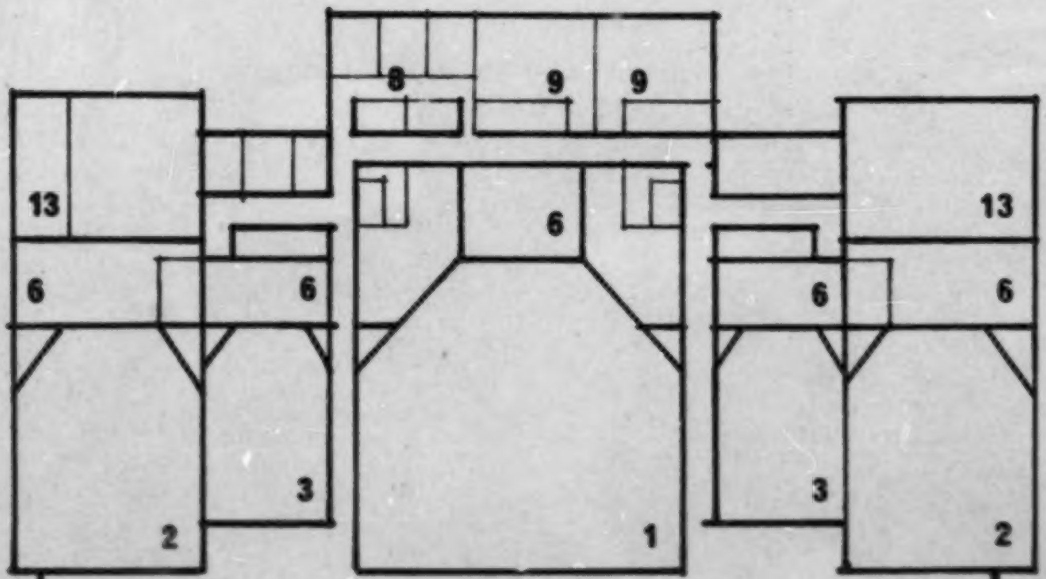
1 Lecture (480)
2 Lecture (240)
3 Lecture (120)
4 Lecture (60)
5 Assembly area

6 Rear projection
7 Preparation
and storage

8 Office and
conference
9 TV studios
10 Graphic arts
11 Photo area
12 Production
storage

13 Mechanical
and storage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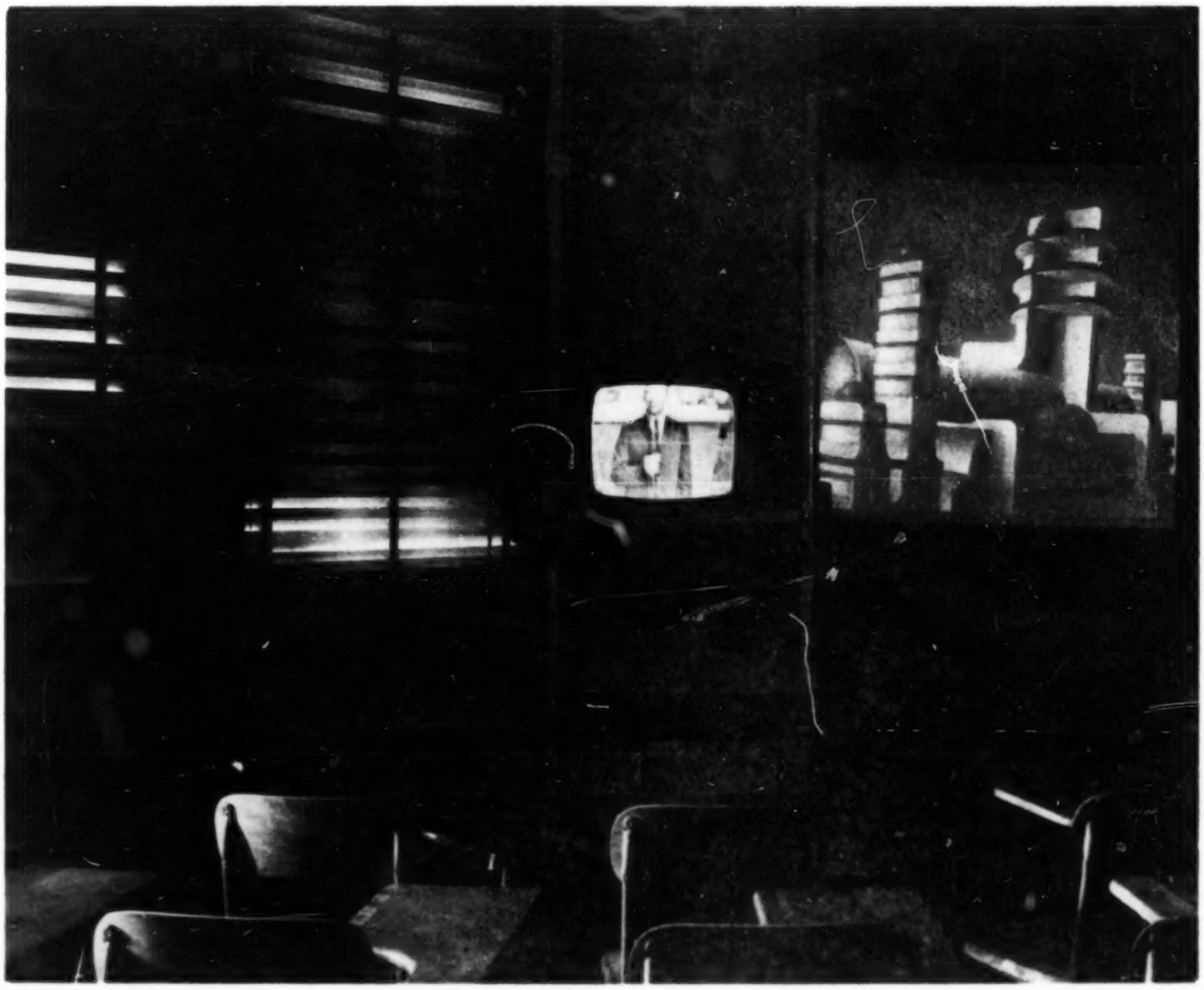

4 DESIGN CRITERIA: AN OVERVIEW

This is a review of Report C– "A Technical Guide"

A basic premise of this series of reports is that for effective and efficient utilization of media new concepts of facilities and their design must be developed. This Report B has presented general planning principles and design guidance for a variety of facilities developed for uses of media. It is also necessary to delve into the details of design–lighting, acoustics, climate, projection systems, equipment, furniture, and the like. Report C–"A Technical Guide" presents this type of information; here it is simply reviewed for those generally concerned with planning and design.

CREATING THE ENVIRONMENT

Lighting

Appropriate lighting is an important design feature that must be considered early in planning. Since the display of projected information is a major design factor in most spaces, two or three levels of illumination should be available in order to create lighting which is compatible with the wide variations in image brightness. Ambient light–stray light falling on screen surfaces–must be held within tolerable levels to avoid "washing-out" images. This is not as serious a problem in rear projection as it is with front projection; spaces which have natural light also pose special problems of controlling stray light. In all cases, regardless of the medium being used, enough light must be available to allow note-taking, reference to printed materials, and eye-to-eye contact. Within a learning space, all primary task surfaces should appear about equally bright, and the surrounding environment should be no less than 1/10 as bright. Bright trim or any sources of glare should be avoided. Control of lighting should consist of pre-determined levels activated by the teacher or by the projection equipment.

Acoustics

Good hearing conditions are essential in facilities with media even though uses of recorded sound cause conflicts with the trend toward open planning and flexibility. Acoustical design must control the passage of unwanted sound between spaces, the distribution of sound within a space, and the level of acceptable background noise. Basic laws of physics involving the nature of partition materials, the sound reflectance and absorptive qualities of surfaces and materials, the distribution of sound waves within a space, and the leakage or spill of sound between spaces must all be considered at the outset of design in order to create an acoustically satisfactory environment. Good acoustics begin with initial planning and end with the installation of proper amplification systems for recorded sound. In between are many important design decisions.

Climate

A proper learning environment includes a climate in which the student is alert and attentive. Usually this involves cooling the air (often more of a problem than heating), dehumidification, and ventilation. Mechanical systems must be designed to respond quickly to variations in heat output by students, equipment, and lighting, but which will maintain even temperatures and avoid drafts. The location of equipment to avoid disturbing noises and transmission of sounds between spaces is important.

FURNISHING THE ENVIRONMENT

Plan furniture and casework early

Too often the selection of furnishings for learning spaces is left undone until money, time, energy and professional assistance have been dissipated. Furniture should be considered as a part of the total facility, should be planned and selected early, and should meet basic aesthetic, functional and economic criteria. With so many types of furniture and casework needed to complete a school plant, and with so many products to choose from for each type, careful analysis and extensive research will be required for completely satisfactory results.

Three types of seating...

In learning spaces with media, seating is of three basic types—fixed, moveable, and combined. Each has particular applications, and in some rooms a mixture of two or three types may best meet functional requirements. With projected media, fixed seating has the advantage of assuring that every occupant is in the proper relationship to display surfaces; many kinds of fixed seating are available—individual seats with various writing surfaces, continuous writing surfaces with various individual seats, and multiple units of writing surface and seat. The individual seats often have the disadvantage of inadequately sized tablet arms; the continuous writing surfaces solve this, but require more floor area per student.

...each with appropriate applications

Many, many kinds of moveable seating are available, some with combined writing surface and seat and some with these separate. Obtaining large writing surfaces is a problem; also, when seating is selected to allow flexible groupings, it is an advantage to employ modular writing surfaces which can form seminar tables or discussion groupings: Often a mix of several types of moveable seating will solve the variety of needs within a single space. Finally, a combination of fixed writing surface and loose seat will be an appropriate solution in some medium-sized rooms.

Other kinds of furnishings complete the environment

Other kinds of furniture are necessary to complete learning spaces–storage units, teachers stations, lecterns, work counters with sinks and utilities, and cabinets with screens, projectors and other media equipment. The latter "media modules" have been discussed in detail in conjunction with the planning studies in Part 3 of this report. In all cases, this furniture and casework should be designed and selected as an integral part of the space; this should be a responsibility of the architect-designer.

Individual study units and carrels

In libraries, resources centers, learning spaces, and many other places throughout the school, individual study units must be provided. Sometimes these become carrels with or without wiring for reception of audio and video information from remote locations. Carrels need not be more elaborate and more expensive than the functional needs require; often, mock-up carrels can be made in the local shop for experimentation and the final can be made in quantity to meet the local requirements. Again, the carrels should be planned by the designer as an integral part of the environment, and again, a mix of several different types of carrel may be the best answer for a school or college building.

PROJECTION SYSTEMS

Design of projection systems

The display of information by various projection techniques is a basic design factor in educational facilities with new media, and involves far more than the simple provision of projectors and screens. For effective uses of projected media, coordinated projection systems are required; the design of these systems poses some new and and unique problems for architects and planners.

Two types of projection systems

Two basic types of systems may be used–front and rear–and each has desirable and undesirable characteristics. In larger rooms, where room light is necessary during projection, rear projection is generally the best system. In either case, a projection system consists of the best combination of projector, screen, controls, projected material, viewing area and room lighting necessary to accomplish specific learning objectives.

Characteristics of screens and projectors

A tremendous variety of projectors is available in terms of types of projection materials, lumen output, controls, cost, dependability, and the like. Projectors must be selected to meet specific local needs; generally simple, inexpensive equipment is available to perform most tasks. In selecting screens, a number of screen characteristics such as brightness, brightness ratio, contrast ratio, gain, reflection factor, viewing angle, and bend angle, must all be considered in relationship to the characteristics of the projector and the other components of the system. Many types of front and rear projection screens are available, each with its particular set of inherent characteristics.

Controls for equipment and lighting

Equipment controls should be in the hands of the instructor and should be simple and uncomplicated. Remote controls for all equipment will be necessary in the larger rooms and are preferable in the smaller ones. Also, the equipment controls should also control the lighting; when a projector is activated by the instructor, the lights in the room should go to the level of light appropriate for that medium.

Legibility standards

All projected materials that contain symbolic information that must be comprehended should meet basic legibility standards both in terms of contrast ratio and size of letters and numbers.

Determining the viewing area

Finally, the student must be placed in the proper relation to the projection surfaces; this "viewing area" is defined by minimum and maximum viewing distances, and a maximum viewing angle. These factors vary according to the types of projection, the projection material, the screens, and the amount of light in the room. Then, the actual capacity of a room is determined by the type and arrangement of seating placed within the viewing area which is appropriate for a particular set of conditions.

OTHER MEDIA HARDWARE

Complexities of selecting production equipment

Besides the components for projection systems, many other types of equipment must be selected to introduce media into an educational system. The selection of production equipment used in the various production-support centers, regional centers, educational laboratories, and communication centers, requires vast professional experience and advice, and such advice should be sought early in planning if it is not available within the school system or institution. Decisions will be required as to equipment types for television origination, recording and distribution, motion picture filming and processing, audio recording and distribution, and duplication and printing, not to mention assembly, editing, drafting, preview, conference and the dozens of other functions housed in these facilities.

Other hardware for learning spaces

In the learning spaces other decisions are necessary including the selection of chalkboards, tackboards, TV monitors and receivers, audio distribution systems, student response systems, and audio playback equipment. In the resources facilities, additional equipment ranging from individual projectors and recorders to computer-based information storage and retrieval systems must be selected. All of these decisions require study and evaluation based on performance, economic, and aesthetic criteria.

The work of the project was greatly aided and assisted by an Advisory Committee who met periodically with the staff, participated in the conferences, and reviewed materials. Those on the committee gave freely of their time and talents.

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